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THE MELANOMATA OF GREY AND WHITE HORSES*

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INTRODUCTION

DAWSON⁵ defines melanoma as "any abnormal collection of melanin pigmented cells." This fits the case satisfactorily for animals, with this exception, that melanin is not always intracellular. It is extruded by the cells producing it, the melanoblasts, and it may also be liberated and lie free in the tissues from the breaking down of the carrying cells, the melanophores.

The writer has made but few comparisons between animals and man for the following reasons. Animals being completely clothed with hair and the white races having so little in comparison, it is obvious that their pigmentary systems must differ. It is also clear that those animals which live constantly out of doors will require most pigment in their skins and hair as a protection against the elements. Another important difference is in the annual shedding and replacement of hair which entails increased pigment production. It should be mentioned also that there are great differences between the various species of mammals, even those living in the same localities, regarding their pigmentary needs, which are complicated still further in the case of the domestic animals by man, who has mated them and crossed them simply to follow the dictates of fancy. It is no wonder, then, that difficult problems are met with, and some of these are of considerable importance to

animals from a health standpoint. The melanomata come under this head but there are many others; some of these will be discussed in another paper. The writer records his observations from the point of view of a worker in animal pathology. He has not had access to all the literature on the melanomata, but has selected a few medical and veterinary references of which a short summary is given and conclusions from which are drawn.

CONCLUSIONS OF VARIOUS AUTHORS

Medical.—Becker² gives some useful information concerning the pigment-forming cells of the epidermis. He evidently believes that the basal cells, though they look alike, may function differently, because he says that "not all basal cells actively form pigment at the same time." He concludes that "Melanomata seem to be benign or malignant proliferations of melanoblasts, normally found in all pigmented epidermis." Sir J. Bland-Sutton⁴ says "Melanosarcoma does not appear to be such a malignant affection in horses as in man." Spencer¹⁹ believes that "In lower animals the pigmented cells of the dermis serve a useful purpose in addition to the protection against sunlight—colour is changed voluntarily and reflexly in mimicry of surroundings." Dawson⁵ believed, like Spencer, that the pigmentation in animals had other purposes than protection against light, heat and moisture. Rash¹⁸ mentions the harmful effect of too much light on the skin (in man) which often results in permanent freckling. Miescher¹⁷ discusses the effect of light on the skin and describes some experiments. He concludes

* A summary of this paper was presented by the writer at the British Medical Association meeting held in Winnipeg in August, 1930. A short review appeared later in the *Brit. M. J.*, 1931, 2: 431.

that "The horny layer, therefore, protects the epidermis, while the pigmentary layer protects the cutis." Masson,¹⁶ speaking of pigmented naevi, says "these small stains, these small cutaneous tumours which are congenital, often hereditary, are essentially benign, but are capable of engendering the most dangerous melanotic cancers." Masson quotes Unna's theory of the migration of epidermal cells into the dermis where they become modified and transformed into naevus cells. In concluding his studies on the pigmented naevi, Masson says, "All the pigmented naevi are 'neuronævi'. All are neuromas of the terminal tactile nerves." Ewing⁷ says "Melanoma is a pigmented tumour arising from a specific mesoblastic cell, the chromatophore; probably also from the tactile cells lying in the epidermis and probably also from the nerve cells of the derma." In 1930, Ewing⁸ wrote again as follows: "There remains, however, very substantial histological evidence that in many melanomas certain cells of the Malpighian layer participate in the process." Virchow (quoted by Goldberg⁹) "ascribed the occurrence of (melanotic tumours) in white horses as evidence of a constitutional weakness."

Veterinarian.—Gohier (1813) and Brugonne (1871), quoted by Le Blanc *et al.* (1915), drew attention to the frequency of melanotic tumours in white horses, and looked upon them as a manifestation of an aberration of the pigment, which not being utilized in the skin and hair becomes deposited in the tissues. Gohier believed in the hereditary nature of melanosis. Ball¹ states that there is only one type of pigmented tumour in horses and that it is true melanosis. He believes that the primitive external melanotic tumour may form internal metastases.

Goldberg,⁹ quoting Jaeger (1911) on melanosis in calves, concludes that the pigment cells are lymph-endothelial cells. These cells may multiply and become transformed into tumour cells. Goldberg defines melanosis as that form of pigmentation associated with nodular growth, infiltrating more or less the neighbouring structures, producing metastases.

Liégeois.¹⁴ The radiations of short wave lengths have an after-effect—that of thickening the skin. This thickening is to be noticed in the corneum and goes parallel to actino-resistance. Block's "dopa" reaction should be mentioned and its connection with the cells of Langerhans.

COMMENTS ON THE LITERATURE

Becker's paper² is the most helpful article the writer has seen. He reviews some important works and gives some excellent figures. Fig. 7 shows dendritic melanoblasts in the basal layer. The writer does not agree with Becker's view that the long strands of melanin are attached to the cells themselves,—they are much too large and coarse. It is more likely that the "strands" which fill the interstices between the cells are accumulations of free melanin granules. The melanin-bearing filaments which arise from the melanoblasts are much finer and more thread-like. In his Figs. 10 and 12, likewise, in which the melanin capping is believed to be above the nucleus, the writer shows later in this paper that the cap is extra-cellular and that the so-called nucleus is in reality the basal cell itself which has rounded up after leaving the layer below.

Spencer and Dawson both have stated a belief in the old idea of protective coloration in animals. The writer does not agree with this and has stated so elsewhere.¹⁰ Briefly, protective coloration should give the body protection in a health sense, and all other considerations are subservient to this. Rash mentions permanent freckling in man through over-exposure to light.

Miescher's observation the writer agrees with entirely, but would add that in animals the hair may take the place of the thickened horny layer and the pigmentary layer also.

The old veterinarians, like Gohier and Brugonne, believed that in white horses melanotic tumours were hereditary, and there are cases recorded in which the progeny of certain sires were sure to develop tumours in later life. Ball in France and Goldberg in America incline to the belief that melanotic tumours are malignant melanomas.

MELANOMATA IN HORSES

It is a well known fact that melanotic deposits are common in certain breeds of horses like the Percheron, which turn grey and finally become white with age. It would appear that this is a hereditary defect, because horses of other colours, like bay, brown or isabelline, seldom have melanotic tumours. The writer has made many post-mortems on horses at various times. All were not examined specially

for melanomata, but it gives him assurance for the above statement, and he is in full agreement with other workers who have made similar observations. Horses of the grey type are usually nearly black when they are colts, but by degrees the hairs lose their pigment and it is coincident with this that the deposits of melanin become more and more in evidence. It seems obvious, then, that pigment production goes on at the original rate, though it is no longer taken up by the hair roots. It has been stated before that animals shed their coats annually. The writer has also proved¹² that when the new hair starts to grow there is a very active and rapid pigment production in the skin. If it can be shown that this seasonal production of melanin occurs in grey and white horses just as it does in coloured animals, it would go a long way towards proving the writer's hypothesis that melanomata are non-malignant in the majority of cases, and are due to an abnormal production of melanin. This theory will be elaborated further on in the paper.

Longevity of horses having melanomata.—In the writer's experience few animals become incommoded by the tumours until they reach old age. The horses continue to work and keep fat despite the large accumulations of melanin in their bodies. To give a clear idea of the usual course of the tumours, a letter received from a farmer will be quoted:

"I am forwarding by this mail a growth which I removed from a mare . . . Her age was at least twenty years, and quite probably nearer thirty. Colour—grey . . . She was in good spirits, though had failed lately when the growths became too much for her. One could not wish for a better animal to work. These growths were first noticed probably four years ago and were then about the size of peas. There were several of these about the anus and vulva . . . They caused her great trouble to pass her manure and water, and this large one seemed to affect her leg so that she could scarcely walk . . . I had another mare who was slightly affected the same way . . . I have another grey mare 22 years, I think, who seems to have some too . . . One man said he understood that it was grey mares who got these lumps and that they always proved fatal in the end."

Similar histories could be given also from the writer's own experience.

POST-MORTEM FINDINGS

CASE 1

A flea-bitten grey mare (part Percheron) 15 to 20 years old. The animal was in good condition and had been working a short time before she was killed.

Externally there was little evidence of melanosis

except five or six small nodules on either side of the raphe between the anus and vulva, and a few lentil-shaped nodules on the under surface of the tail. The skin was very darkly pigmented around the eyelids and perineum.

In the abdominal cavity there was no evidence of melanin. When the chest cavity was opened, blackened spots were noted on the pericardial sac and three black nodules in the posterior border of one lung. Between the third and fourth ribs there was a bulging of the intercostal muscle and a few small black nodules at the anterior and posterior borders of the ribs. These small nodules and the bulging of the muscles had probably been caused by outside pressure and the nodules had pushed out the pleura in front of them. It was evident that there must be a deposit of melanin above the ribs. It was soon found that a large melanotic mass was present on both sides of the body covering the top of both scapulæ and extending downwards into the subscapularis muscles. The total mass of melanin must have weighed 5 to 6 pounds. The pigment was not injuring the muscles; it was spreading along the natural divisions in the connective tissues and was simply displacing the muscle bundles. The only part where the melanin was causing injury was in the intercostal muscle. This can be explained by the horse's collar which came above this part, so that the melanotic mass was intermittently subjected to pressure. Pressure may also account for the invasion of the subscapularis muscles.

The thoracic glands were infiltrated and some of them black in colour. Along the borders of the ribs there were small deposits in the periosteum. A number of melanotic nodules were encountered near the brim of the pelvis, in some cases being in the fibrous sheaths round the blood vessels.

The writer has autopsied another case similar to this where the pigmented mass was being forced into the chest cavity, and he has also had three other cases where melanotic deposits were present under the seat of the collar. Goldberg and Spencer have made similar observations as to the location of the tumours.

CASE 2

A grey Percheron mare 6 years old. This animal had been in the writer's stables for five years. When a yearling she was quite dark in colour, but gradually became lighter. She was in good condition when killed. First of all it may be stated that the accumulation of pigment occurred in places which are not very vascular. Many glands throughout the body were pigmented, the bronchial, sublingual, supramammary, and especially the glands in the pelvic region.

On the internal surface of some of the ribs in the thorax there were spindle-shaped deposits of melanin, some of them 3 to 4 inches in length. When the periosteum was stripped off, the bone was left clean. Deposits were found in unstriated muscle in the broad ligaments of the uterus.

Near the coxo-femoral articulation melanotic deposits were noted in the ligaments between the fibres. These were wedge-shaped masses and had forced the fibres apart.

In the tail, especially near the most dependent part, small accumulations of pigment were seen deep in the cutis.

Dawson⁵ states that in pigmented cancers "the extension of pigmentation in the lymph

gland metastases is a marked feature of many cases and is often out of all proportion to the size of the primary growth". In the case just described it can be stated that there was no visible primary growth, and it looked as though too much melanin had been produced for the needs of the skin and hair, so that it was being deposited here and there in more or less avascular places.

In other autopsies several points have been noted, which may be mentioned without giving the other details of the cases. In a general way it has been observed that there is a weakness or defect in the skin on either side of the line of union between the two halves of the body. The tumours which show externally are most common in the unhaired perineal region. If this is true of the tumours, it is also plainly to be seen in the case of white markings, especially on the foreheads of horses. It would appear that when the two halves of the body were joined together there had not been enough pigment to go round and that the flow had stopped at the same distance on either side of the median line. But this is not the real reason. The pigment stopped because the white cells could not produce it. These white markings are strongly inherited. Dunn⁶ found that white-faced mice breed true. Eight matings resulted in 46 young, all of them white-faced. This he speaks of as being similar to the star or blaze on the foreheads of horses.

Another possible reason for tumours being common near the tail, head, and the base of the mane, is connected with the large amount of hair in those regions, and in consequence a larger flow of tyrosin may be directed to those parts. Goldberg thinks that the collar and crupper may cause irritation, but when one sees the harness irritating the body in other places, as it does without causing trouble, and finally the cases occurring in animals which have not worn either collars or cruppers, then the theory of irritation does not appear to have much behind it.

The melanomata are generally not attached to the epidermis in horses, even when the mass below causes a nodular bulging. Possibly the panniculus carnosus muscles causing skin movements may account for this.

FRECKLES IN HORSES

Freckling in horses depends on several factors, exposure to sunlight, the length and colour of the coat, and age. In man it would seem that children are more likely to freckle than adults, but it is the reverse in horses. The writer has shown elsewhere¹² that white hair does not protect the skin so well as pigmented hair, hence white horses are especially liable to sunburn and freckle. Freckles are an indication of a defensive reaction against sunlight, therefore it is strange that the horses whose bodies are already surcharged with melanin should freckle so much. It means that the epidermis has not a sufficiency of melanin to protect itself, and it would seem probable that the epidermis is being robbed of its proper supply of tyrosin by the melanomata themselves. Another curious fact is that the hairs growing through the freckles are recoloured a rusty red or black in parts of the body which were once darkly pigmented and later turned white. In a few instances larger spots than freckles have been seen which were from 1 to 2 cm. in diameter. These naevus-like areas were noted on the most exposed parts of the body, *i.e.*, the flanks.

Under the microscope a freckled piece of skin shows an uneven distribution of pigment, the indentations being lined with melanin-secreting cells and the promontories having none. In some cases, if there is a hair follicle bearing pigment under the epidermal layer, the cells of the basal layer will show no pigment. This scarcity of pigment may be seen in cattle at the transition point between black and white, and it also occurs in spotted areas of the skin. The areas which freckle in horses are the more exposed parts of the body, such as the face and flanks. Where the hair is longer, or shaded, as under the belly, freckling does not occur. In the unhaired parts of the body, like the eyelids and perineum, there may be an excess of pigment, but in the perineum, as mentioned above, it is likely that there is a superabundance of melanin.

It can be stated that the production of freckles or of a general pigmentation of the epidermis is not confined to specialized cells in definite areas, because freckling can be seen in parts of the body which are normally covered

with hair, such as the crown of the head in man. In heavily furred animals, shaving of the skin will bring about a pigmentation of the epidermis where it is normally non-pigmented. In the same way the pigmentation or absence of colour in hair is controlled by a wide variety of causes.

To sum up, freckles occur commonly in old white horses and are associated with melanomata. Not only does the skin become pigmented but the hairs growing out of the freckled spots are recoloured a rusty red or black. The whole process suggests a bodily reaction to protect vital spots in the skin.

HISTOLOGICAL FEATURES

The epidermis above the melanomata.—In horses, as indicated before, there is almost always a zone which is clear of pigment between the basal layers and the tumours below, even when these cause a bulging of the skin. The writer has seen the tumours and the epidermis connected, but rarely so. If the two do connect it is his opinion that the pigment-carrying cells have come up from below. Even when the melanoblasts become surcharged with melanin so that the ranks of cells are disarranged, they still ascend to the exterior, though irregularly. In Fig. 10, two cells can be seen moving upwards, leaving a track behind them; after a number of such occurrences the cells of the rete mucosum lose their symmetrical arrangement, as seen in Fig. 11. This abnormal appearance has repeatedly been observed in the perineal region.

Normal appearance of the epidermis in horses.—In the thicker parts of the skin the Malpighian cells in the basal layer are columnar and are held tightly together, excepting at the sides of the papillæ, where they lie at a different angle and are less tightly packed. All the cells of the basal layer produce melanin and extrude it through dendritic processes (see Figs. 20 to 22). When these cells move up, they leave behind the melanin which they have extruded below and at the sides, pushing in front of them an arrow-shaped cap of melanin granules. As soon as they are released from the pressure of the neighbouring cells they assume a spherical shape. They now have the appearance of round balls, the arrow-shaped cap of melanin filling up the space between the

spheres in the layer above. The pigment becomes less and less noticeable as the cell rises, and another force, that of cornification and hardening, now hinders the advancing cell, so that it flattens out and finally assumes a spindle shape. The cells which enter the ascending stream from the sides of the papillæ meet the stresses in a different way and do not push the melanic cap in front of them—one more often sees loose grains of melanin irregularly scattered round them. The liberation of melanin granules in and near the basal layer explains the contrast in colour between the corneum and the basal cells. What exactly happens to this extruded and cast-off pigment is difficult to determine, though a careful examination will reveal granules scattered evenly everywhere. It is thus possible that there is very little which is actually left behind and, taking into consideration the greater surface of the upper layers, the pigment may be scattered too thinly to produce colour. Fig. 13 is an unstained preparation; extracellular pigment and branching will be noted. The branching has the appearance of issuing from the melanoblasts, but such is believed not to be the case. The branches fit in to the interstices between the cells and are simply collections of melanin, much too large and broad to be dendrites. The pigment seems to fade out at the top of the photograph, which may be accounted for by a scattering of the granules. Fig. 10 shows the melanoblastic columnar cells of the basal layer and the changes in shape as they ascend. The author has not noted any kind of pigment-producing cell other than the columnar type in the skin of horses. It should also be mentioned that the melanin granules in the epidermis are much smaller than those encountered below in the melanomata.

The effects of leucoderma on the cells of the epidermis.—In horses leucodermic spots are common in the perineal region. They are usually an after-effect of coital exanthema. The blanched spots are very persistent and may remain for years. This proves that the cells of the basal layers have lost their power of pigment production, but can still perpetuate themselves. In other words, they resemble albinotic cells. On the edges of the spots where pigment making starts again abnormal looking cells were noted. They outwardly resembled the cells called

"Langerhans", which are considered to be malignant.

In examining Fig. 25, taken with a low power, the cells certainly have an abnormal appearance, but on closer inspection under a higher magnification it will readily be seen that the cell is not a cell at all, but merely an abnormal amount of melanin surrounding a Malpighian cell. In Figs. 21 to 24 the strands of melanin are visible. What are these cells which produce so much melanin? The most reasonable explanation seems to be that they have been overstimulated to produce through the effects of disease, or that they are receiving a superabundance of tyrosin. An interesting fact, also, concerning these cells is that the pigment scatters as they ascend to the corneum. An inspection of the photographs will show this clearly.

Extension of melanin through pressure.—Fig. 4 shows the invasion of the subscapularis muscle under low power. Fig. 5 is a high-power view of the same. Intermittent pressure was being exerted on the tumour mass by the horse's collar when at work. The cells containing the pigment were large and irregular, some appearing to coalesce. Where they are squeezing between the muscle bundles they can be seen to alter their shape to fit the narrow interstices.

The dividing line between the tumours and healthy tissue.—Fig. 6. In this figure the dividing line is very sharply defined and there is no sign of extension. Many of the melanomata in the horse are sharply delimited, as in this case.

The colour of melanin.—It has been said that melanin may be brown or black, as the case may be, and that both are one and the same thing. While this is no doubt true from a chemical standpoint, the brown deposits are the ones which are active and show extensions, whereas the black masses seem to be quiescent and often one finds free granules and debris in them.

THE MELANOMATA IN THE VARIOUS TISSUES

In the sub-cutis the tissues invaded are mostly the connective tissues. Long strands bearing melanin push their way round obstacles such as hair roots and give a curious wavy appearance. The sweat glands are infiltrated and spotted with pigment, often appearing entirely isolated. It is a curious fact that the sebaceous glands are not invaded at all, which may be

accounted for by their oily nature. Blood vessels may become surrounded with pigment, yet it can be peeled off by hand, leaving the vessel intact. This appears to be different with the smaller vessels whose endothelium may be filled with pigment. The serous coats may also be infiltrated. Figs. 7 to 9 show the nature of the pigment and the way it extends.

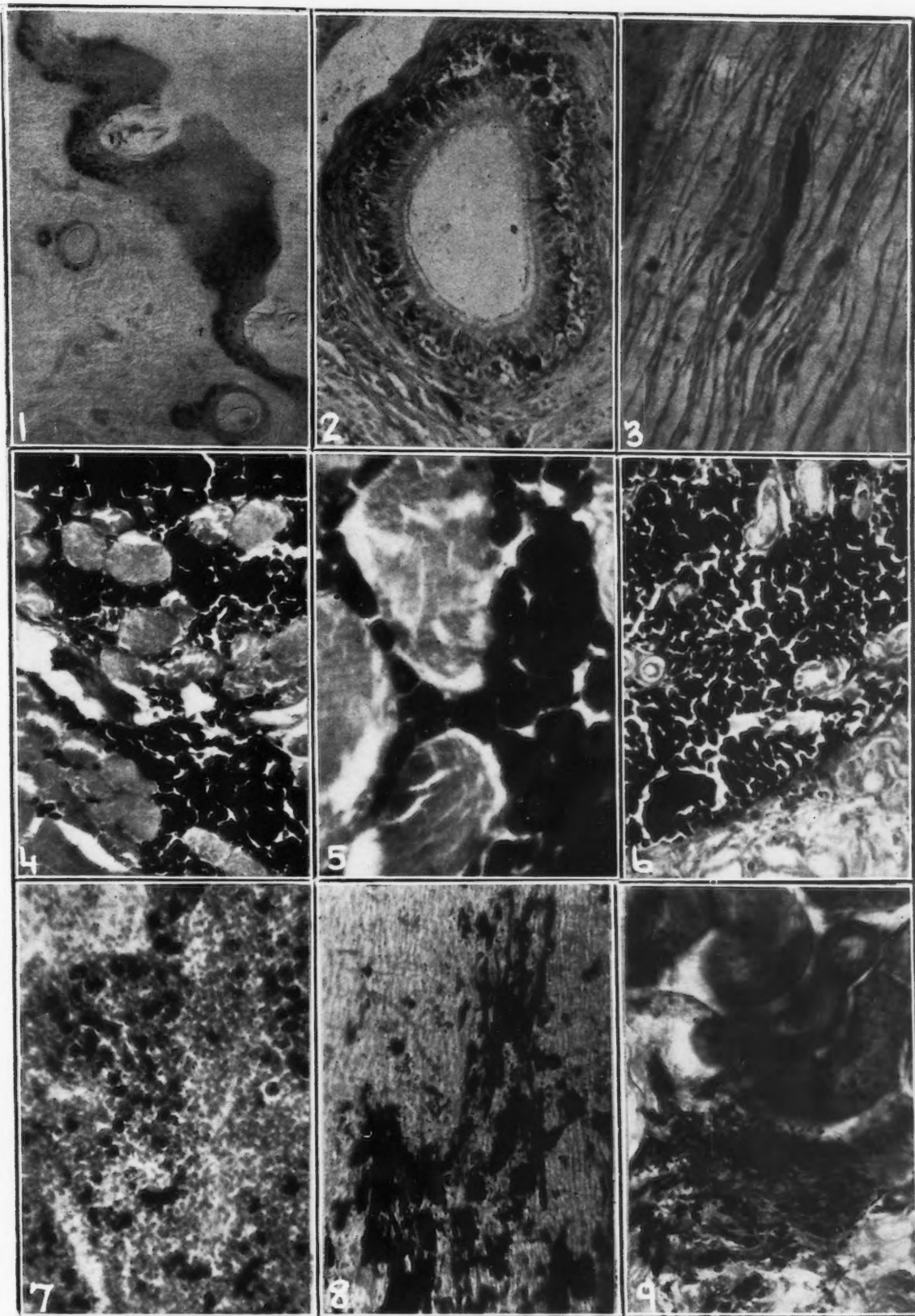
Periosteum.—The pigment in the periosteum appears to have been produced there from its method of extension. Fig. 8 shows a bit of periosteum stripped off one of the ribs. The small vessels in this specimen are lined with melanin-filled endothelium.

Lymph glands.—It is quite easy to see that the mononuclear cells in the glands are picking up the pigment. Once they are filled, they tend to clump together. (Fig. 7).

Unstriped muscle.—The invasion seems to take place in two directions. In Fig. 3 a longitudinal mass is seen and three or four others cut across. They have very much the appearance of sarcosporidian cysts, except for the colour.

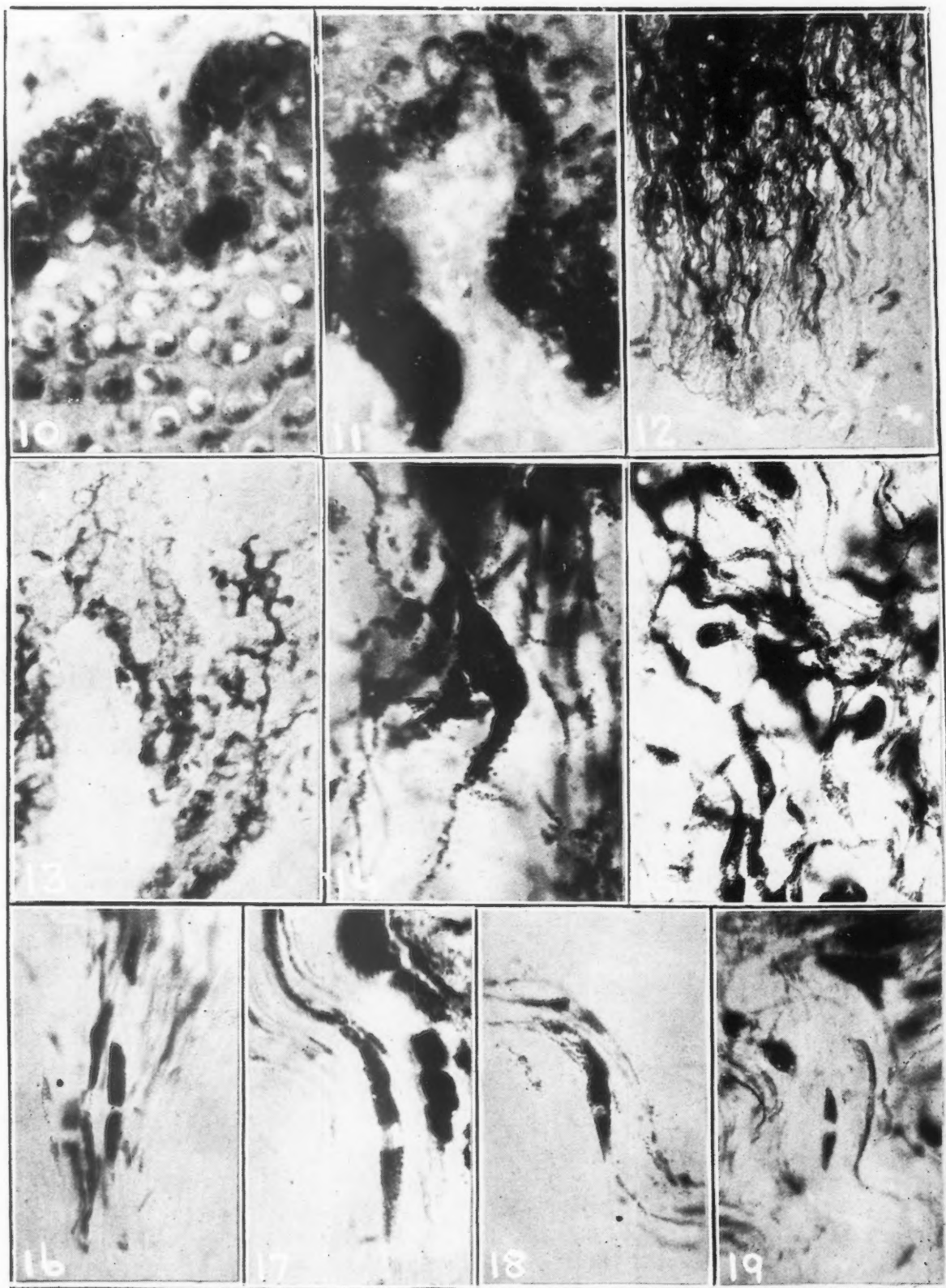
Deep tissues.—Staining methods are difficult to apply, as they tend to obscure the melanin containing processes and granules. Therefore unstained preparations were studied as a rule. The most satisfactory of these were from the peritoneum. Pieces of tissue were stretched over glass slides, put through the alcohols, and cleared. Fig. 12 shows strings of pigment extending through the tissues. Under high powers the cells from which the melanin-bearing filaments arise exhibit marked differences from the melanoblasts in the epidermis. They are definitely spindle-shaped and usually terminate in long processes. There is a central nucleus, the body of the cell being packed with large melanin granules. The granules extend down the processes, starting with four or five abreast, then diminishing in numbers so that in the filiform ending there remains only a single row of granules. In the young extensions only one or two producing cells may be seen (Fig. 18). The strands of melanin often twist and turn spirally in the interstices of the supporting tissues. In the larger, and therefore older, deposits, large round cells intermingle with the strands, most of these being so filled with pigment that the nucleus is obscured. They are considered to be melanophores.

EXPLANATION OF FIGURES
ALL FIGURES ARE ORIGINAL AND ARE UNTOUCHED
PLATE I



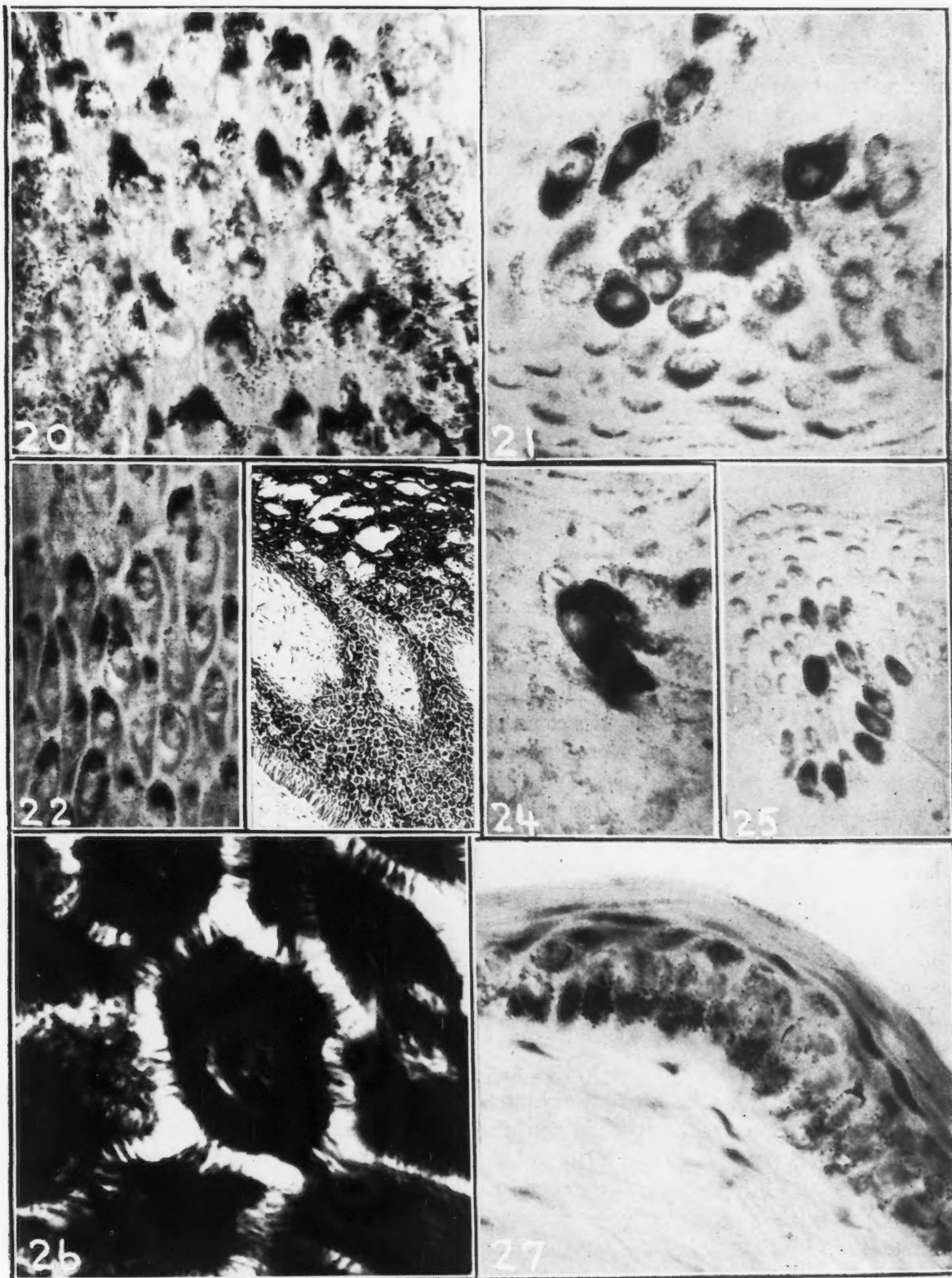
- FIG. 1.—Uneven pigmentation of skin. Pigment in bays and not in promontories. This occurs in cattle and horses. It indicates a scarcity of pigment and of protection to the most sensitive parts of the skin.
FIG. 2.—From epididymis of bull. Presented by Dr. Kingscote, Ontario Veterinary College.
FIG. 3.—Pigment in unstriped muscle. Suspensory attachments of uterus.
FIG. 4.—Mechanical extension of melanin into subscapularis muscle due to pressure from horse's collar.
FIG. 5.—High power view of Fig. 4. In the pigment extension the melanophores alter their shape as they squeeze between the muscle bundles.
FIG. 6.—Dividing line between tumour and dermis.
FIG. 7.—Lymph gland. The mononuclears are picking up the pigment and tend to clump together.
FIG. 8.—Extension of pigment under periosteum. Unstained.
FIG. 9.—Old melanin deposit round sweat gland. Irregular shaped masses of melanin and free granules.

PLATE II



- FIG. 10.—Malpighian cells surcharged with melanin. Two have moved up, leaving a gap in the basal layer.
 FIG. 11.—Disarrangement of basal cells through over-production of melanin.
 FIG. 12.—New extension in peritoneum (low power unstained).
 FIG. 13.—Unstained section of epidermis. The melanin granules fill the interstices between the cells giving the false appearance of processes emanating from them.
 FIG. 14.—Single spindle-shaped melanoblast in peritoneum. Note coarse grains of melanin in the cell. Unstained.
 FIG. 15.—Dendritic melanoblasts in peritoneum. The processes are larger and the melanin coarser than it is in the melanoblasts of the epidermis.
 FIGS. 16 AND 19.—Melanoblasts in dermis. These are considered to be young forms as they have no extensions at their extremities. The nuclei appear to be pinched in. This is on account of a bulging of the cell wall through pressure of melanin granules. Unstained.
 FIG. 17.—A producing melanoblast in the dermis.
 FIG. 18.—New extension in peritoneum. Note wavy strands bearing melanin granules, and a single melanoblast.

PLATE III



- FIGS. 20 AND 22.—Ascending cells in epidermis pushing melanic cap in front. They have left behind the melanin which surrounded them below and at the sides. The cap fits into the space between the circumferences of the cells above them. Free melanin granules at sides.
- FIG. 21.—Malpighian cells resembling so-called "Langerhans cells". It will be noted that the melanin is extra-cellular. What appear to be the nuclei are the basal cells themselves. Section cut from the edge of a leucodermic spot from perineum of horse.
- FIG. 23.—Thickened and spongy epidermis from cow, due to pressure from tumour below. Specimen presented by Dr. Brown.
- FIG. 24.—Large local production of melanin from an over-producing cell.
- FIG. 25.—Low power view of "so-called" Langerhans cells. It will be noticed that most of the cells are in the basal layer. As they ascend they lose their melanin, so that in the outer layers there is no evidence of their presence.
- FIG. 26.—Epidermal cells with numerous bridges. These cells have been forced apart by pressure of the tumour below, and it is believed that the processes were formed through traction.
- FIG. 27.—Normal pigmented epidermis. That the melanoblasts extrude their melanin is quite evident. This figure is for comparison between Figs. 14 and 15 which show coarser dendrites and larger granules.

In the dermis spindle cells were also observed and several may be seen in Figs. 16-17-19. These cells exhibit a ring-shaped nucleus of lesser diameter than the remainder of the cell. The nucleus, as in the deeper tissues, does not seem to take any part in melanin production, and the granules cause a bulging of the cell wall on either side. In Figs. 16 and 17 two cells without processes will be noted. They are believed to be young cells and have no prolongations. It is quite evident from the examination of many deposits that both cells and processes are modified according to the nature of the tissues they are infiltrating and the obstacles or pressures they encounter. The old deposits can easily be recognized from the new on account of the debris lying in the tissues and the irregular shape of the pigment accumulations; besides, the pigment is much blacker in colour than in the actively growing masses. To the writer it is evident that the spindle-shaped cells he has described are the melanoblasts of the deeper structures, and are identical with those of the cutis vera. Their long processes filled with granules, their bodies bulging with them also, suggest production within the cell. In contrast with them the melanophores are round phagocytic cells, all gorged to repletion; they lose their identity and are carried away to collect in large masses. In comparison with the melanophores of the epidermis the granules of the deep cells are much larger. (See Figs. 14-15 and 27).

Changes of shape in cells.—The writer has modified and altered his conceptions about the shape of cells through a valued suggestion of Dr. H. B. Speakman, Director of the Ontario Research Foundation, which is briefly this—that many types of cells which are thin-walled and plastic are normally spherical when no pressure is being exerted upon them. The description of the cells in the epidermis and their extraordinary changes in shape are fully explained by the above truth. It is also permissible to assume that when cells are held firmly together they may through time become moulded into various shapes. An example of this is to be found in the corneum, where dessication would also play a part. Through disarrangement and alteration in pressure cells may thus become atypical. In Fig. 26, which is a photograph of epidermal cells, large intercellular bridges will be noticed. These cells were being subjected to

pressure from a tumour below. A low power view of the epidermis (Fig. 23) will reveal a spongy open appearance of the corneum. Possibly, also, as suggested to the writer by Dr. P. Masson, there was some oedema present. In any case the large intercellular bridges give a clear picture of a change of character in the cells; they have evidently been separated through pressure. The bridges look like pulled-out pieces of the cytoplasm, which had been fused together before the cells were forced apart.

THE DEVELOPMENT OF MELANOMATA AND MALIGNANCY

Writing in 1927, the author considered that the intermittent housing of animals was an important factor in predisposing them to melanotic tumours. He thought that horses living permanently out of doors might take up the excess melanin in their skins, even though their coats turned white and no longer made use of it. He has satisfied himself now that this is not the case and that semi-wild horses do have melanotic tumours.

Most veterinarians consider that the tumours are likely to recur when removed. This may be true in part, but it is believed that in most instances the deposition is going on at the time of operation, and consequently only a small portion of the tumours are removed. In 1929 the writer killed a horse, aged about 16 years, which showed a number of tumours in the perineal region. This animal had ten pounds or more of pure black tumours, adjacent to or inside the pelvic cavity, and yet the horse was fat and sleek coated. There were none of the usual signs of malignancy.

A theory which could fit the case would be after this fashion. At first the excess of pigment is deposited in avascular places, where it does no harm. By degrees a vicious circle starts, the mother substance is produced in excess (this is harmful to the well-being of the animal) and it is transformed into a harmless inert material—melanin. The cells producing it increase in number and demand more mother substance, so much so that the skin is robbed of its proper supply. The melanomata increase in size and number, and finally, through pressure and displacement, the functions of the internal organs are interfered with. This is the beginning of the end for a melanotic subject. There are

certain facts which support the above contention. Melanin deposits in the tissues are slowly formed, as we have seen, and the opposing reaction from the tissue cells is principally that of phagocytosis. True, a certain amount of damage is done to the lymphatic, sweat glands, and other tissues, but apparently these do not interfere with bodily health.

The suggestion that the mother substance from which melanin is derived is in excessive amount and possibly is deleterious to health requires experimental proof. The reason for the suggestion is that when one finds such large accumulations of melanin it would seem probable that they are in excess of the requirements for the coloration of the hair. Finally, when any abnormal secretion persists over a long period it is likely to cause trouble. In this case the excess is turned into a harmless pigment.

MELANOSARCOMA

In all the autopsies held during the present investigation, numbering over a dozen, no case has been encountered which could be called melanosaarcoma. The writer does not deny that there are such cases, because they have been reported by others. In his series the pigment-producing cells have not been accompanied by large numbers of atypical cells invading the normal structures. From a clinical standpoint, also, there was no cachexia or wasting such as one finds in true cancer. With regard to the inheritance of melanomata it should be mentioned that in calves they are occasionally met with; also in pigs. In young colts no cases have been seen or heard of. This may be because colts are not as frequently autopsied as calves.

BIO-CHEMICAL REQUIREMENTS FOR THE FORMATION OF MELANIN IN THE TISSUES

Melanin is formed by the action of the enzyme tyrosinase on tyrosin or some similar compound in the presence of free oxygen. Enzyme preparations from animal and plant tissues have been studied by independent workers, and their behaviour and properties are similar. There is no evidence to show that compounds containing the hydroxy-benzene nucleus can be synthesized in the body from simple straight-chain carbon compounds, and therefore it is justifiable to conclude from the results obtained by *in vitro* work on melanin production that in animal

tissues the pigment can only be produced in places containing the active enzyme, a supply of free oxygen, and compounds similar to tyrosine. It is reasonable to assume that the continued production of melanin involves an actively functioning blood supply.

SUMMARY

Several medical writers believe in protective coloration in the old sense. The writer believes that animals are coloured primarily for reasons connected with their health.

The pigmentary systems of horses and man differ. Animals are entirely clothed with hair and shed it annually. Horses which whiten with age are predisposed to melanomata. The tumours progressively increase in size with age. This is associated with continued melanin production, though the hair no longer makes use of it.

The melanomata begin to form when horses are still young—six years or over. The deposits are found in avascular places. They are common in the perineum. Other abnormalities in colour occur on the line of union between the two halves of the body. White marks are strongly inherited.

The commonest sites for melanomata are in the regions of the tail and mane. It is improbable that this is due to irritation from the harness, as has been suggested, but more likely that a larger flow of tyrosin is being directed to these parts.

Freckles in horses depend on exposure to sunlight, length and colour of hair, and to age. As they ascend to the corneum the columnar basal cells of the epidermis lose their strands of melanin and alter their shape. At the edge of leucodermic areas the basal cells produce melanin irregularly; some over produce, others are unable to form pigment. Melanic masses may form extensions through pressure from outside the body. The sweat glands may be destroyed by melanin, but the subaceous glands are not infiltrated.

In deep situations the melanoblasts are spindle-shaped, having long processes and coarser melanin than one finds in the epidermis. Many types of cells, such as the basal cells, are round when no pressure is exerted on them. It is believed that many varieties of so-called atypical cells are in reality normal cells which have been

moulded out of shape through pressure, or the release of pressure exerted by œdematous fluids or overgrowth.

Through over-production of melanin the basal cells of the epidermis may become disarranged and appear atypical. Melanomata in horses rarely become malignant.

The writer wishes to express his warmest thanks for the invaluable assistance of Dr. H. B. Speakman, Director of the Ontario Research Foundation. The paragraph on melanin formation he owes entirely to Dr. Speakman, and he wishes to acknowledge many encouraging and helpful suggestions from him.

Dr. Brown, of the Foundation, kindly presented the cutaneous tumour in Fig. 26, and Dr. Kingscote the preparation from which Fig. 2 was taken.

As some of the earlier observations recorded here

were made at the University of Saskatchewan, it is a pleasure to mention President Murray's name in this connection.

REFERENCES

1. BALL, *Traité d'Anat. Path. Gen.*, Paris, 1924.
2. BECKER, *Arch. Derm. Syph.*, 1930, **21**: 818.
3. BLANC, CADEAX, CAROUGEAU, *Path. Chirurg. Gen.*, Chicago, 1915.
4. BLAND-SUTTON, *Tumours*, London, 1917.
5. DAWSON, *The Melanomata*, London, 1925.
6. DUNN, *Am. Naturalist*, 1920, **54**: 465.
7. EWING, *Neoplastic Diseases*, London, 1928.
8. EWING, *Brit. M. J.*, 1930, **1**: 852.
9. GOLDBERG, *J. Am. Vet. Med. Ass.*, 1919, **9**: 2.
10. HADWEN, *J. Hered.*, 1926, **17**: 450.
11. HADWEN, *Trans. Internat. Cong. Entomology*, 1928, **2**: 199.
12. HADWEN, *Canad. J. Res.*, 1929, **1**: 189.
13. HADWEN, *Brit. M. J.*, 1930, **2**: 431.
14. LIEGEOIS, *Ann. Med. Vet.*, 1929, **74**: 4.
15. MASSON, *Ann. d'Anat. Path.*, 1920, **5**: 418.
16. MASSON, *Ann. d'Anat. Path.*, 1926, **7**: 657.
17. MIESCHER, *J. State Med.*, 1930, **38**: 387.
18. RASH, *Brit. M. J.*, 1926, **2**: 786.
19. SPENCER, *Brit. M. J.*, 1923, **2**: 17.

LIPÆMIA RETINALIS*

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LIPÆMIA retinalis, first described by Heyl,¹ of Philadelphia, appears to be a rare condition. Parker and Culler,² in a review of the literature to 1930, and including two of their own cases, record a total number of 38. Lillian Chase³ reported another case recently. Although special study of the eye is a routine procedure in Joslin's clinic, two other cases only have been met with since the first report of two cases from that clinic by Gray and Root in 1923.† The purpose of this communication is to add another met with recently in the clinic for diabetes at the Montreal General Hospital.

RELATIONSHIP TO TOTAL BLOOD FAT

As the name implies, the condition is associated with excess quantities of fat in the blood. Reis⁴ reported the first quantitative analysis in this condition; the blood contained 18.13 per cent of fat. Blood fat analyses were made in 26 of the 39 cases. The lowest value found, when the condition was first detected, was 3.5 per cent.⁵ In each case, when repeated analyses were made, it was observed that disappearance of the lipæmia retinalis was ac-

companied by diminution of blood fat. This suggests that the relationship between lipæmia and the retinal condition is causal and not accidental. Gray and Root,⁶ from a correlation of their chemical and ophthalmoscopic data in one of their cases, suggested that the concentration of blood fat at which lipæmia retinalis develops is somewhere between 2.95 and 6 per cent. Two blood fat analyses only are recorded. Daily analyses of blood fat suggest a lower level; in the case recently reported by Lillian Chase³ the condition disappeared only after the blood fat had decreased to 1.4 per cent. (The analyses were made in Prof. W. R. Bloor's laboratory). The data of our case also suggest a lower critical level.

RELATIONSHIP TO PHYSICAL STATE OF FAT

That lipæmia retinalis depends more upon the physical state, rather than the amount, of fat is suggested from experiences with "masked" lipæmia. Bloor first observed that plasma, while still fresh, may be quite clear, in spite of a fat content of 2 or 3 per cent or more. It is only when such blood is exposed to ordinary room conditions over a period of some hours that it becomes cloudy, due largely to fat globules. To this condition he gave the name "masked lipæmia." Masked lipæmia is, in our experience, not a rare phenomenon in diabetes. It was quite common in the pre-insulin era. As examination

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† Personal communication.

of the fundi by an ophthalmologist is a routine procedure in every case of diabetes in our clinic, and as this is our first case of lipæmia retinalis, it would appear that the latter is due to some condition other than the *total* amount of fat in the blood. Experiences with more marked degrees of lipæmia tend to support this view. For example, in McCann's case,⁷ though lipæmia retinalis was observed when the blood fat was 9.5 per cent, the condition was not present after the blood fat had increased to 10.8 per cent. It is of interest here to note that, though the total fat had increased, the appearance of the blood changed; it was less milky ("masked" lipæmia).

That some condition other than blood fat is responsible for the fundus picture is perhaps best shown in our two cases of lipæmia previously reported; the blood fats were 18.6 and 11.6 per cent respectively, the plasma in each case resembled cream in appearance and consistency and the fundi were normal.^{8,9}

RELATIONSHIP TO DIABETES

That the condition with which lipæmia retinalis is associated is an important etiological factor is suggested from the fact that the fundus changes are practically confined to diabetes, though lipæmia may be found in a variety of conditions; diabetes was present in 38 of the 39 reported cases. The exception was a case of leukæmia.⁵ Moore¹⁰ reports lipæmia without fundus changes in four cases of trench nephritis. Lipæmia is occasionally found amongst the many thousands of non-diabetic bloods which are sent to the laboratory for chemical analysis (urea, creatinine, etc.). The associated conditions in the past included nephritis, pregnancy, carcinoma, tuberculosis, phosphorus poisoning, etc. As these bloods came from the medical wards, and as fundus examination is a routine in these wards, it is of interest to note that lipæmia retinalis has never as yet been observed in these cases.

RELATIONSHIP TO THE SEVERITY OF DIABETES

Severity of the diabetes is probably, aside from the lipæmia, the most important contributing factor. In the first case reported by Heyl, the patient was a male, 20 years of age, with marked weakness, emaciation, "dimness of sight" and leucocytosis (50,000 cells per c.mm.). Heyl then suggested that "given a healthy circu-

latory apparatus, the lipæmia will produce no pathological change of note, provided its presence be not constant; given an abnormal circulatory apparatus, and the lipæmia may give rise to fatty masses occluding the vessels." Of the 24 cases reported to the end of 1922, that is, before insulin was available, 23 were diabetic. The ultimate course of events in this group is not recorded in two instances. Of the 21 remaining persons, 18 died and, of these, death was due to coma in 13 instances; in the case recently reported by Lillian Chase the diabetes was also severe, and our patient was in a state of severe acidosis when first seen. Further indicative of the severity of the diabetes was the frequency with which xanthomata were found. Xanthoma has never, at least in our experience, been found in mild diabetes; as xanthochromia, it has always been associated with severe diabetes. In the last (4th) edition of his "Treatment of Diabetes", Joslin does not refer to the relationship between xanthoma and severity of diabetes, but, in his 3rd edition, he states that "all of the cases (six) belonged to the moderately severe type of diabetes." Of the 39 cases of lipæmia retinalis in the literature, xantho-



FIG. 1

mata were recorded in 4 instances. In our case, the condition was the most marked met with. The accompanying photograph shows the distribution of the lesions about the arms and face*. The fact that there has been only one death amongst all of the cases reported *since insulin has been available* may readily be reconciled with the above view. Recovery is now the rule in all cases of diabetes, regardless of severity, providing the patient is not seen in the agonal period and providing there are no complications which tend to counteract the action of insulin (infection, etc.). This does not fit in with the view expressed by Moore as late as 1925, namely, that "death usually follows shortly upon the discovery of lipæmia retinalis."

AGE INCIDENCE

The ages of these patients are of interest. Of the 40 cases there are no records of age in two instances and in one the patient was described as "young". Of the remaining 37 three only were over 40 years of age. The oldest age recorded is 51 years, by Gray and Root. The following frequency distribution table is a summary of the available data:—

Age (Years)	No. of cases
.... 20	14
21 to 30	13
31 to 40	7
41 to	3

SEX INCIDENCE

Of the 40 cases, there are no records of sex in three instances. Of the remaining 37 persons, 32 were males. No explanation of this sex incidence is offered.

OPHTHALMOSCOPIC PICTURE

Though there are a number of descriptions of this condition, little of an essential nature has been added to Heyl's original observations. . . . "The moment my eye caught the details of the fundus, I saw the remarkable appearance which I shall endeavour to describe. The appearance was the same in each eye, and I was able, through the skill of Dr. Charles B. Nancrede, to obtain a very accurate painting of it. The fundus was free from any evidence of the existence or pre-existence of inflammation; the nerve-margin was well defined, the vessels were not tortuous; no retinal lesion, and no

* An energetic interne (Dr. E. H. Bensley) made a count and found 388 lesions.

hæmorrhagic clots were seen. The abnormal appearances which attracted attention were: (1) The abnormal colour of the blood in retinal vessels. . . . and (2) the apparently large diameter of the vessels; the vessels appeared to have about twice the normal calibre. . . ." The colour of the vessels was described as light salmon, and, by colour alone, the arteries could not be distinguished from the veins.

DIAGNOSIS

The essential features upon which the diagnosis of lipæmia retinalis may be made are few. The changes are entirely limited to the retinal vessels. In examining the vessels, consideration is given to (a) the colour, (b) the size and shape of the vessels, (c) the differentiation between arteries and veins, and (d) the character of the "light streak". The colour has been variously described as light salmon, strawberry and cream, milky, light pink milk and a silvery sheen or glow. A characteristic feature of the vessels, as Heyl points out, is their size; they appear to be twice the normal calibre. The vessels in advanced cases may be flat and ribbon-like. The smaller arteries and veins are practically indistinguishable from each other. In advanced cases, it is also difficult to distinguish between arteries and veins amongst the larger vessels. The light streak may be entirely absent or of unusual breadth. The retina and acuity of vision are usually normal. The nerve head has been described as fawn-coloured, chocolate-coloured and waxy in appearance, but is, also, usually normal.

Heyl first pointed out the possibility of mistaking the condition for leukæmic retinitis. The very characteristic colour of the retinal vessels in lipæmia, however, is absent in leukæmia. This alone, as Heyl points out, helps to differentiate the two conditions. Moore points out that the condition is pathognomonic and cannot be confused with any other ophthalmoscopic picture. Differential diagnosis, however, is assisted by blood analyses (fat content) leukocyte count, etc.). Polycythæmia is also excluded by the latter. Wagener reported the co-existence of lipæmia and leukæmia in one case. The following are the essential data in our case.

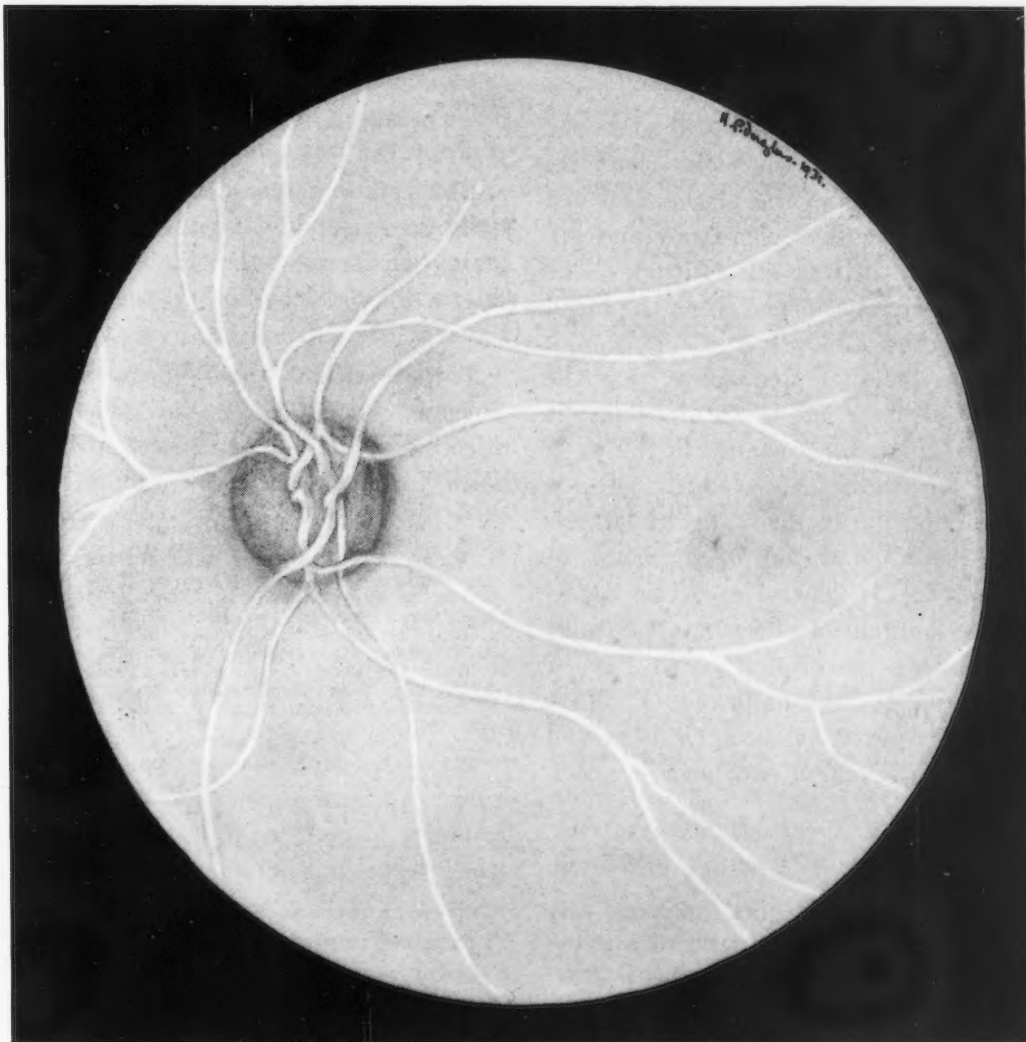
CASE REPORT

J. D., a male, aged 14 years (Hosp. No. 3090/31), a diabetic of two years' standing was admitted to the service of Dr. C. P. Howard on June 2, 1931. On his admission, the physical findings were essentially negative,

with the exception of (a) acidosis, (b) paronychia, and (c) marked xanthomata. The urine contained large amounts of sugar and acetone bodies, albumin and granular casts. The blood was obviously lipæmic and the following were the results of the first analysis:—

Sugar	0.370 per cent.
Cholesterol	1.04 " "
Fat	9.24 " "
Urea nitrogen	13 mg. per 100 c.c.
van den Bergh	0.2 units.
Red blood cells	4,260,000.
Hæmoglobin	110 per cent.
(Because of the lipæmia, accurate estimation of hæmoglobin was difficult).	
Wassermann reaction ...	negative.

The results of the fundus examination made on admission were as follows: Both fundi were alike. The discs were of a dirty white colour, slightly hazy, and the small vessels were not well seen. The arteries and veins on the discs were of a salmon pink colour and indistinguishable from one another. They were engorged and increased in size to about one-half times the normal. The light streak was absent. While the large vessels on the disc and those near it were of a salmon pink colour, the most striking feature of the fundus was the milky white appearance of the vessels from about one and a half disc diameters from the disc to the periphery. They were exactly as if milk had been poured into the vessels.



The following were the results of the examination of the twenty-four hour sample of urine obtained the following day:—

Volume	3,100 c.c.
Sugar	4.5 per cent—139 grams.
Titrateable acid +	
Ammonia (c.c. N/10) ..	2,976
Ammonia	3.8 grams.

The respiratory data were as follows:—

Basal metabolic rate ...	minus 14 per cent.
Respiratory quotient	
(fasting)	0.738 per cent.

The retina was transparent and the choroidal circulation showed quite well. The macula was well made out and the foveal reflex was present. There were no areas of exudation, no retinal hæmorrhages, and no signs of inflammation of any kind in the fundi. The right vision was 6/6, the left 6/36, with about three diopters of hyperopia uncorrected. The accompanying illustration, for which we are indebted to Miss Hortense Douglas, the hospital artist, is that of the condition when the patient was first seen.

Besides the usual routine, blood fat analyses and ophthalmoscopic examinations were made daily and the following is a summary of the results:—

Date June	Blood fat (%)	Plasma	Fundi
2	9.24	Creamy	See above notes.
3	10.91	"	Condition the same.
4	8.16	"	" " "
5	7.36	"	" " "
6	6.66	"	The arteries and vessels are distinguishable; the discs are clearer, and the light reflex of the arteries is well seen. The vessels toward the periphery are still definitely white.
7	5.43	"	Condition the same.
8	5.10	"	" " "
9	4.83	"	" " "
10	4.79	Milky	" " "
11	1.65	Turbid	Discs, arteries and vessels are nearly normal in appearance.
12	1.13	"	Condition the same.
13	0.84	Clear	Fundi are normal.

It will be noted that there was still some evidence of lipæmia retinalis when the blood fat was only 1.65 per cent and the plasma had lost both its creamy and milky consistency and appearance; however, it was still turbid. The fundi were not perfectly normal when the blood fat had decreased to 1.13 per cent. It would, therefore, appear, as suggested above, that the condition is not *entirely* due to the lipæmia. It is suggested that anatomical change in the walls of the vessels, because of the severe diabetes, is probably a contributing factor. This hypothesis fits in with Allen's conception of the cause of lipæmia in diabetes—a general cachectic condition of the whole organism affecting all cellular functions including permeability. It is of interest to note that the ophthalmoscopic picture paralleled the recovery from the acidosis as well as the lipæmia. This patient was on an experi-

mental diet and recovery was slow. An opportunity was, therefore, afforded for daily studies for a period of twelve days. As is well known, with adequate diet and insulin, lipæmia and acidosis usually disappear very rapidly. On June 11th, there was still some evidence of acidosis; the urine contained 1656 c.c. of N/10 acid and 2.18 grams of ammonia; the sodium nitro-prusside reaction was still positive, though the ferric chloride reaction was negative.

SUMMARY

A case of lipæmia retinalis is reported—the forty-second on record, including Joslin's two new cases.

The level of blood fat at which the condition disappeared was below that previously recorded.

Blood fat analyses and other data obtained daily and correlated with ophthalmoscopic examinations suggest that the condition is also influenced by factors other than the degree of lipæmia.

The condition which theoretically leads to lipæmia, namely, a general cachectic condition affecting all cellular functions, including permeability, is suggested as a contributing factor.

REFERENCES

1. HEYL, Phila. Med. Times, 1880, 10: 318; *Ibid.*, Trans. Am. Oph. Soc., 1880, 50: 54.
2. PARKER AND CULLER, Am. J. Oph., 1930, 13: 573.
3. CHASE, J. Am. M. Ass., 1931, 97: 171.
4. REIS, Arch. f. Oph., 1903, 55: 437.
5. WAGENER, Am. J. Oph., 1922, 5: 521.
6. GRAY AND ROOT, J. Am. M. Ass., 1923, 80: 995.
7. MCCANN, Johns Hopkins Hosp. Bull., 1923, 34: 302.
8. RABINOWITCH AND MILLS, J. Metab. Research, 1926, 7: 87.
9. RABINOWITCH, Am. J. M. Sc., 1928, 176: 489.
10. MOORE, Medical Ophthalmology, 2nd Ed., Churchill, London, 1925.

THE MORBID HISTOLOGY OF PINK DISEASE.—Very few necropsies in pink disease have included a microscopical examination of the nervous system, and, therefore, W. G. Wyllie and R. O. Stern record the results of the histological examination of this system in seven cases. In all of these the spinal cords showed the diffuse infiltration with small cells first described by Paterson and Greenfield, and considered by those investigators to be glial rather than hæmatogenous. The present authors agree with this conclusion, but they could not demonstrate the existence of cellular processes by either neuroglial or microglial staining methods. Chromatolysis of the central type was found in the anterior horn cells of the spinal cord in five cases; it was more apparent in the lumbo-sacral region, particularly extensive in the most chronic case, and clearly due to an "axonal reaction." In only two instances

was there any abnormality above the level of the medulla. The authors conclude that the essential lesions in pink disease appear to be situated in the skin and in the nervous system, though it is probable that the skin lesion is not pathognomonic. In all the cases the clinical symptoms were much in excess of the pathological findings, although cellular infiltration was always present, and degeneration of the peripheral nerves was found in four cases. Discussing the pathogenesis of this condition, the authors remark that vitamin deficiency can be excluded, and that no history of a preceding infection or the presence of an inflammatory cervical adenitis was obtained. Liver therapy proved effective in the general condition of some of the patients under observation, the irritability and pain quickly subsiding, and there being no recurrence.—*Arch. Dis. in Childhood*, June, 1931, p. 137 (Abs. in *Brit. M. J.*).

HYPERVITAMINOSIS*

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THE strong, specific, anti-rachitic action of irradiated ergosterol was first shown by Holtz,¹⁹ Gyöorgy¹³ and Beumer and Falkenheim³ and has since been often demonstrated. It appears that the feeding of normal individuals with irradiated ergosterol has led to somewhat different results in relation to the calcium and phosphorus content of blood. In healthy adults, Howard and Hoyle²¹ found that the administration did not lead to an appreciable change in the inorganic phosphorus content of the blood, whereas Kroetz³² has found an increase in inorganic phosphorus. Hess, Lewis and Rivkin¹⁶ found that the administration of irradiated ergosterol to normal children led to an enhancement alike of the calcium and phosphorus content of their blood. With various chronic ailments in adults which were treated with increasing doses of viosterol an increase of calcium in the serum has been shown.

It is also a remarkable result of ergosterol treatment that in cases of osteomalacia a decided improvement was observed by Starlinger.⁵³ Treatment by fat restriction and large doses of viosterol was found by Linder and Harris³⁵ to be effective in cases of chronic diarrhoea with tetany. In artificially produced fractures in rats, Bors⁵ claimed a speedy healing was obtained. Inspired by Bors' investigation, Knoflach²⁹ studied the clinical effect of viosterol in 51 cases of fractures of long bones, 31 other cases being reserved for controls. In children and in adults up to fifty-five years of age, no material influence upon the period of healing was noted, although callus formation was more rapid and abundant. In persons over fifty-five years old, however, a remarkable difference was observed. In 9 such cases, consolidation of the fractures occurred apparently more speedily than in young patients. Feriz¹²

obtained good results with viosterol in the treatment of delayed union of fractures.

The pathological action of overdoses of ergosterol was first mentioned by Pfannenstiel⁴¹ and further investigated by Kreitmair and Moll³¹ in the same year. They produced in animals which were fed large amounts of ergosterol a strongly toxic action and an extreme medial calcification. Since then Kreitmair and Hintzelmann,³⁰ Wentzel⁵⁶ and Duguid,¹¹ and many others have shown a moderately complete picture of so-called hypervitaminosis. It results in calcification of the blood vessels, the stomach and the kidney. In rabbits, Baumgartner, King and Page² found a softening of the bones. Kidney concretions have been described by Dixon and Hoyle¹⁰ (1928), (Hoyle²⁰), and Spies and Glover.⁵² Schmidtman⁴⁷ (1928), Reber and Walkoff,⁴⁵ Rabl,⁴⁴ Heubner¹⁸ and Harris,^{14, 15} Simmonet and Tanret,⁵⁰ all confirm in general these pathological findings with different preparations of irradiated ergosterol. Putschar⁴³ described marked calcification of the tubules and interstitial tissue in the kidneys of an atrophic child which had received viosterol (Vigantol) for three months prior to its death. Poucher,⁴² however, claims that no ill effects have followed the feeding of as much as twenty-one to fifty-two times the prophylactic daily dose of viosterol.

Schwenholz⁴⁸ claimed that in the case of pregnant rats, fed 10 mg. of ergosterol a day, the young were resorbed *in utero*, were prematurely aborted, or were born dead. In a very few cases they lived, but were very small and under-developed and did not survive long. Comel⁷ found that with bitches under intensive ergosterol treatment, enough ergosterol passes into the milk of the mother to provide toxic symptoms in the pups. Numerous other papers, mostly quite uncritical, have dealt with the effects of extraordinary doses. In many cases

* Read before the Biochemical Section of the Canadian Chemical Association in Montreal, May, 1931 (Can. Chem. Met., July, 1931).

the authors failed to determine the potency of the product they employed, or at least did not state it, giving only the quantity of irradiated ergosterol in mg.

Harris and Moore,¹⁴ working with a standardized product, demonstrated that 1,000 times the curative dose for rats was not harmful, that 10,000 times was definitely toxic, and 100,000 times was rapidly fatal. Bills and Wirick⁴ found that they had to give 4,000 times the curative dose to get definite injurious effects in rats; 40,000 times the dose was strongly toxic. Harris and Moore¹⁴ showed, further, that ergosterol itself, unirradiated, that is, the precursor of vitamin D, was harmless even in these large amounts; and that it was the active principle, the vitamin D which resulted on irradiation, which was the toxic substance. Over-irradiation, which destroys the anti-rachitic factor, resulted in a non-toxic product. Windaus,⁵⁷ on the other hand, has claimed that preparations of vitamin D, formed by irradiation of ergosterol, also contain a toxic substance which is probably distinct from the anti-rachitic factor, although the preparations most active in curing rickets are at the same time most toxic. Schultz and Meyer⁴⁹ claim that there is no parallelism between the anti-rachitic factor and the toxic factor in irradiated ergosterol.

The marked calcification of the vessels and organs and the apparent softening of the bones of animals fed ergosterol has led several investigators to look for an increased calcium and phosphorus content of the serum. The calcium is usually definitely increased, but the phosphorus is often inconclusive, showing variations which are not much greater than in the normals. Klein²⁸ and Smith and Elvove⁵¹ (1929), in investigations into the effect of large doses of ergosterol on the calcium and phosphorus values of serum and tissue, found that the calcium was nearly always high but the phosphorus only slightly so. Taylor, *et al.*,⁵⁴ working with dogs, found, however, that the serum phosphorus showed a very marked rise just preceding the death of the animal. De Toni⁹ was able to show a rise in the inorganic phosphorus of the serum of cattle, horses and human beings when irradiated ergosterol was added to it.

The hypercalcæmias produced by administration of parathormone and ergosterol are in many

respects similar. The animals lose weight and appetite and some have diarrhoea. The daily administration of 10 mg. of irradiated ergosterol to normal dogs produces, according to Jones, Rapoport and Hodes,²⁵ a marked hypercalcæmia within two weeks, which is often higher than that produced by parathormone. A marked hypercalcæmia can be rapidly produced in parathyroidectomized dogs by the administration of large doses of irradiated ergosterol. Dogs from which the parathyroids have been removed can be kept alive indefinitely and apparently in good health by repeated doses of ergosterol. Demoli and Christ⁸ found that giving irradiated ergosterol to dogs before parathyroidectomy prevents the onset of tetany. Pappenheimer³⁹ considered the action of ergosterol in producing hypercalcæmia and calcification to be independent of the parathyroid system, since he was able to get the same ergosterol effects in rats from which he considered he had removed all traces of parathyroid tissue. Taylor *et al.*,⁵⁴ however, consider that vitamin D exerts its action on blood calcium through stimulation of the parathyroid function. These workers found that after removal of the parathyroids by the usual method, administration of viosterol relieved the resulting tetany and raised the blood calcium, but if the operation was made to remove all parathyroid tissue from the neck of the dog, the animals were very resistant to viosterol treatment, tetany was not relieved and blood calcium remained low. (For an excellent review of the work on the possible relation of the effects of ergosterol to parathyroid function see the paper by Taylor, *et al.*⁵⁴).

The question of the source of extra calcium in the serum under viosterol treatment has been a matter of some controversy. Hess, Weinstock and Rivkin,¹⁷ Baumgartner, King and Page,² Light, Miller and Frey,³⁴ Brown and Shohl,⁶ Watchorn,⁵⁵ Harris and Innes¹⁵ and others have considered it to be drawn in whole or in part from the skeleton. On the other hand, Jones, Rapoport and Hodes²⁵ consider that the extra calcium comes from the food by increased absorption, and Jones and Robson,²⁶ failing to find any decrease in the bone ash after ergosterol treatment, conclude that "irradiated ergosterol in extremely toxic doses has no specific action which results in actually withdrawing

calcium salts from bone comparable to its ossifying action when given in therapeutic doses."

In a series of experiments conducted on chickens we have found, as in the rabbits, a definite increase of the serum calcium, but only inconclusive variations in the phosphorus. This has also been the finding of Massengale and Nussmeier³⁷ for chickens. The birds, unlike rabbits and rats, however, have not shown the same definite calcification of the vessels. In a former investigation we were unable to discover any calcification in either vessels or organs, but in the experiments to be described we have now succeeded in producing marked calcification in the kidneys of most of the birds by a more prolonged period of feeding with an excess of ergosterol. As far as we are aware, this is the first record of definite calcification being produced in hypervitaminosis in chickens. Kreitmair (1928) considered chickens as being among the most refractory to ergosterol treatment of all the animals he tried. With doses which would produce severe calcification in cats, rabbits and rats, he was unable to demonstrate any changes in chickens. Their general condition, however, has been much the same as that of rabbits and rats. They have lost weight during the latter stages of feeding and have developed a marked leg weakness. It was expected that this weakened condition of the bone would be accompanied by a demineralization of the skeleton. If such withdrawal of calcium salts took place, however, it was not sufficiently large to show on analysis of the bones, as the ash, calcium and phosphorus of the dried bones of the chickens receiving excess of ergosterol were practically normal. It was found, however, that administration of parathormone to a similar group of chickens over a similar period of time also produced no appreciable change in the mineral constituents of the bone. Since parathormone is thought to produce its well known effect of raising the serum calcium by withdrawing calcium from the skeleton (see, for instance, Lambie, Kermack and Harvey,³³ Bauer, Aub and Albright¹ and Jaffe and Bodansky²⁴ [1930]) it was felt that the extra calcium produced in the serum by both ergosterol and parathormone probably came both in part from the bone and in part from increased absorption from the gut. In the experiments to be described there was

ample calcium in the diet, and hence, increased absorption may here have been the predominating factor in producing the extra calcium. The apparent softened condition of the bone, together with the normal ash content, presents, however, an anomalous situation which it is hoped to elucidate by further experiments, using animals on diets containing both high and low calcium content.

Accompanying the softened condition of the bones of their rabbits, Baumgartner, King and Page² observed a decrease in the bone phosphatase (the enzyme discovered in ossifying cartilage and bone by Robison⁴⁶ and thought to be responsible for bone formation and maintenance). King and Hall²⁷ confirmed this finding, and in the present investigation a similar decrease in bone phosphatase under the action of ergosterol feeding has been observed. The enzyme content of the bones of the birds receiving parathormone, on the other hand, has remained quite normal; this is the reverse of the finding of Page³⁸ for the action of parathormone.

EXPERIMENTAL

On February 12, 1931, twenty-four five months' old barred Plymouth Rock pullets were divided into four pens of six birds each.

Each bird in pen 1 received 3 c.c. (1500 D) of viosterol* daily; those in pen 2 received 6 c.c. daily. Each bird in pen 3 received 5 units of parathormone† ($\frac{1}{4}$ c.c.) daily, while the birds in pen 4 received 10 units of parathormone ($\frac{1}{2}$ c.c.) daily. The viosterol was given by means of a rubber catheter per os. The parathormone was administered by intramuscular injection.

The birds were weighed individually each week for six weeks, after which time, if alive, they were sacrificed and necropsies performed.

1. GROWTH AND DEVELOPMENT‡

For pen No. 2 we can consider this a regular decrease when we omit the first value. It is best to consider pen No. 1 in the same way. The values of pens 3 and 4 can be considered as growth or increase data. The increase for the

* We wish to record our thanks to the Winthrop Chemical Company, who kindly supplied us with this concentrated solution of ergosterol.

† The "parathormone" was kindly supplied to us by the Eli Lilly Company.

‡ We are indebted to Dr. R. C. Moffatt, of the Ontario Agricultural College, for this analysis of the growth rates.

first week in pens 1 and 2 can be considered as a "hang over" from previous natural growth, as the birds were still growing when changed from normal diet to this treatment.

The marked changes in the physical condition of the birds with comparatively small changes in the weights necessitated a rather detailed study of the growth data.

TABLE I.
AVERAGE WEIGHTS OF BIRDS AT WEEKLY INTERVALS
IN OUNCES

Pen No.	Feb. 14	Feb. 21	Feb. 28	Mar. 7	Mar. 14	Mar. 21
1	57.0	57.2	57.8	56.2	55.4	48.6
2	56.0	61.8	59.4	55.2	51.6	47.8
3	66.2	69.5	69.8	70.8	69.3	67.2
4	48.0	49.3	52.7	53.7	55.7	57.5

The equation for all growth data is $W=Ae^{kt}$ where W is the weight, A is a constant, and e is the base for natural logarithms, 2.71828. k is a growth constant, which when multiplied by 100 gives the instantaneous percentage rate of growth and t is the time measured in units—in this case one week—from the beginning of the period for which the data are used.

In the case of pens 1 and 2, which give decay data and follow the law of decay, the value of k will evidently be negative.

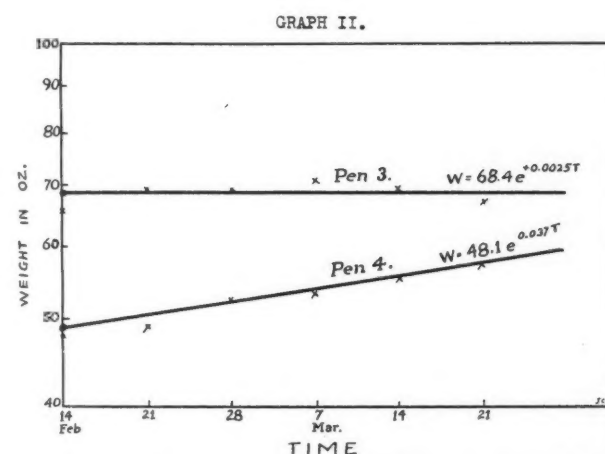
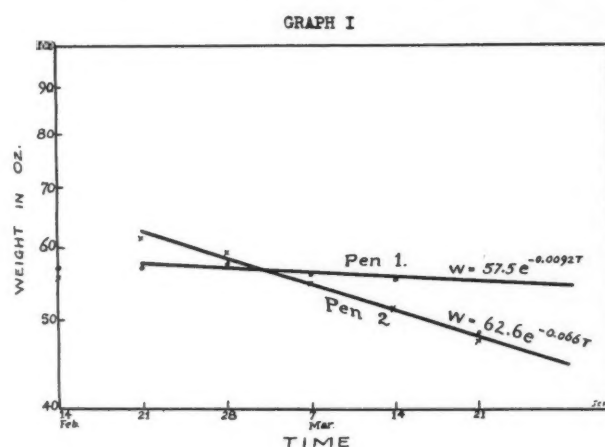
Taking logarithms of the equation $W=Ae^{kt}$ we get the equation $\log W = \log A + 0.4343 kt$ or $\log W = B + 0.4343 kt$ which will be a straight line between the variables $\log W$ and t and the lines will slope upward from left to right.

For decay curves, as for pens 1 and 2, we have $W = Ae^{-kt}$ or $\log W = B - 0.4343 kt$, which will be a straight line slanting downward from left to right. This can be shown to advantage on semi-logarithmic paper by plotting weights against time. (See Graphs I and II).

Using the method of least squares to find the equation of best fit for the above type, the following equations were found:

Pen 2	$W = 62.6e^{-0.066t}$	using last 5 values only
Pen 1	$W = 57.5e^{-0.0092t}$	using last 5 values only
Pen 3	$W = 68.4e^{0.0025t}$	using all data
Pen 4	$W = 48.1e^{0.037t}$	using all data

For pen 2, the constant 62.6 is the most probable value of the weight corresponding to zero time or the weight at the beginning of the period for which the data were taken to work out this equation—in this case February 21. Similar interpretations can be made for the other equations. Pen 1 decreased from this



period at the rate of only 0.92 per cent. However, pen 2 decreased at the rate of 6.6 per cent per week. Pens 3 and 4 increased at the rate of 0.25 per cent and 3.7 per cent respectively.

Geometric mean method (Moffatt).—In this method the rate of growth is based on the geometric mean of the values used (pen 2)

$$\text{or } k = \frac{-10.2 \times 100}{3\sqrt{61.8 \times 51.6}} = -6.05 \text{ per cent}$$

RATES OF GROWTH USING GEOMETRIC MEAN:

Pen 1 -1.05 per cent

Pen 2 -6.05 per cent

Pen 3 +1.14 per cent Using the same values as previously.

Pen 4 +3.62 per cent

The values obtained by this method agree very closely with the logarithmic method, which is the accepted method where the growth is very definite.

This detailed analysis of the growth data shows that there is a definite decrease in the rate of growth of the birds receiving 3 c.c. of viosterol daily (-1.05 per cent) and a corresponding greater decrease for those receiving 6 c.c. of viosterol daily (-6.05 per cent). At the same time, the birds receiving parathormone show definite increase in the rate of growth—those receiving 5 units daily increasing at the rate of +1.14 per cent and those receiving 10 units daily at the rate of +3.6 per cent. A superficial examination of the weekly weights of these birds does not show any such striking changes.

The birds in pen 2 (6 c.c. viosterol daily) and No. 459 (pen 1—3 c.c.) after three weeks of experimental feeding began to show very definite symptoms of disturbance. The first symptom noticed was a continual shaking of the head (which later was noticed in all the birds in pen 2) and in a few days the birds would walk with a stagger. Later, complete loss of equilibrium was noticed in a few cases. The bird, when attempting to walk, would sway and then pitch forward on its head, fall on its side and be quite unable to assume the standing position. This condition suggested a lesion of the cerebellum or spinal cord, but at necropsy and on histological examination nothing definite was found.

In order to study this peculiar condition, two birds, Nos. 450 and 452 were retained on the treatment after the other birds had been sacrificed. From March 24th to 30th, these birds received no viosterol, when it was noticed that the condition of unsteady gait and shaking of the head had improved.

On March 31st each bird received 1 c.c. of 10,000 D.* viosterol. This was continued for 3 days, when the unsteadiness reappeared. No viosterol was given then for 4 days. On April 7th each bird received 1 c.c. of 1,500 D. viosterol and the treatment was discontinued. No. 450 died on April 10th. No. 452 continued to decrease in weight and died on April 24th, weighing only 24 oz.

2. BONE ANALYSIS

Total ash.—After necropsy, the tibia and tarsus of the left leg of each bird were re-

moved for analysis. The bones were freed from adhering tissue, longitudinally divided, freed from marrow and dried at 80° C. They were then broken up by means of bone forceps, transferred to a Whatman's thimble and subsequently extracted with ether in a Soxhlet fat extractor for twelve hours. The fat-free bone was then ground to a fine powder by passing it through a small grinding mill, and a sample of one to two grams was transferred to a weighed crucible. The percentage of ash was determined in the ordinary way in an electric muffle furnace.

Bone calcium.—A sample of 0.5 grams of the finely ground bone was transferred into a 100 c.c. digestion tube. A few c.c. of concentrated nitric acid were added and the tube gently rotated. In order to destroy the organic material 2 c.c. of perchloric acid were added and the material digested on a coil heater until heavy white fumes of perchloric acid were given off. When the solution on cooling became colourless it was transferred and made up to 500 c.c. with distilled water. Two c.c. of this solution (accurately measured with an Ostwald-Folin pipette) were transferred to a pyrex centrifuging tube and the calcium determined by the oxalate method, as outlined in a preceding paper (Hall and King^{22, 23}).

Bone phosphorus.—One c.c. of the above solution was transferred to a 15 c.c. volumetric flask and the phosphorus was determined colorimetrically by Martland and Robinson's³⁶ modification of the Briggs' colorimetric method.

The results of the bone analysis are recorded in Table II. There appear to be no significant variations from the normal values for bone ash, calcium, phosphorus or $\frac{\text{Ca}}{\text{P}}$ ratio in any of these pens, as compared with the values found for these in normal birds of the same age (Hall and King).

Bone phosphatase.—We have already shown (1931) that the phosphatase content of the bone varies considerably with the condition of the bone; the bone phosphatase is consistently high in rachitic bones and subnormal in hypervitaminosis bones. From this it was felt that, when taken in conjunction with other important assays, the phosphatase content of the bone is a valuable index of the condition of the bone. For this reason, the amount of phosphatase present in the right tibia and tarsus of every bird

* Kindly supplied to us by the Mead, Johnson Company.

was determined in the manner already described by us. The values are tabulated in Table II.

TABLE II
PEN 1. (3 c.c. 1500 D. Viosterol daily)

No.	Per cent Ash	Per cent Ca.	Per cent P.	Ca. P.	Bone phosphatase (Units)
454	54.7	20.0	9.3	2.15	1.52
455	54.0	19.2	9.2	2.09	0.30
456	53.8	18.9	9.0	2.10	2.32
457	53.4	19.8	9.3	2.13	0.34
458	53.1	19.7	10.0	1.97	1.14
459	51.5	19.2	9.1	2.11	0.58
Av.	53.4	19.4	9.3	2.09	1.03

PEN 2. (6 c.c. 1500 D. Viosterol daily)

448	54.0	19.6	9.3	2.11	0.34
449	55.4	21.1	9.3	2.27	0.06
450	56.4	19.7	9.7	2.03	0.24
451	55.4	19.8	9.8	2.00	0.34
452	52.4	19.6	8.9	2.20	0.08
453	53.4	20.9	9.7	2.15	1.04
Av.	54.5	20.1	9.4	2.13	0.35

PEN 3. (5 units Parathormone daily)

460	52.4	19.8	9.5	2.09	6.20
461	51.1	19.1	9.5	2.01	2.90
462	52.8	19.1	8.8	2.17	5.00
463	54.0	20.3	10.2	1.99	2.68
464	52.2	18.3	9.1	2.01	4.26
465	50.3	17.9	9.3	1.93	2.06
Av.	52.1	19.1	9.4	2.03	3.85

PEN 4. (10 units Parathormone daily)

442	55.4	20.2	9.6	2.10	
443	51.4	18.2	9.2	1.98	3.80
444	54.2	21.4	9.8	2.19	2.20
445	50.5	20.4	9.4	2.17	3.04
446	52.5	20.3	9.4	2.16	4.68
447	52.3	18.8	10.0	1.88	1.40
Av.	52.7	19.9	9.5	2.08	3.02

An analysis of these data shows that the average for the birds receiving 3 c.c. viosterol daily is 1.03 units. The average value found for 12 normal birds of the same age was 3.47 units (Hall and King). Three of the six birds show very low values, while three are only moderately low. On the other hand, the birds which received 6 c.c. viosterol daily, with one exception, show very low phosphatase values, having an average of only 0.32 units. Our findings would appear to indicate that the phosphatase values are roughly indicative of

the severity of the condition of hypervitaminosis.

Contrasted with the phosphatase values for the hypervitaminosis chickens are those as exhibited by the birds in pens 3 and 4 receiving parathormone. The birds in pen 4 (10 units of parathormone daily) have an average of 3.02 units of phosphatase, which is within the range of values obtained with normal birds. Those birds which received 5 units of parathormone daily show an average value of 3.85 units.

Serum calcium.—Blood was drawn from the wing vein of each bird every week and calcium was estimated on 2 c.c. of serum by the standard oxalate titration method.

The average values obtained for pens 1 and 2 are shown in Table III. The individual variations in the values obtained for the birds in pens 3 and 4 (parathormone) were so great

TABLE III.

PEN No. 1.

WEEKS

No.	1	2	3	4	5	6	7
454	14.7	..	15.9	24.4	22.1	19.9	25.2
455	9.8	14.0	14.0	20.1	..	..	17.1
456	9.7	11.9	12.6	14.8	17.5	25.1	23.8
457	14.4	11.1	22.6	25.0	..	17.1	17.3
458	10.3	11.7	11.3	20.0	..	21.1	17.0
459	11.1	13.4	14.6	17.4	*	..	..
Av.	11.7	12.4	15.2	20.3	19.8	20.8	20.1

PEN No. 2.

448	11.1	21.7	17.6	13.5	13.7	15.1	16.9
449	10.1	11.0	13.3	17.2	18.5	..	16.5
450	11.6	22.5	16.6	16.5	16.6	17.2	..
451	10.2	12.3	16.9	*	..	..	..
452	11.7	13.4	16.0	17.0	..	..	21.4
453	11.0	9.2	10.5	15.3	22.3	24.0	18.9
Av.	10.9	15.0	15.1	15.9	17.8	18.8	18.4

*Died or were killed.

that no conclusion could be made from them, and they are therefore not included in the Table. This was probably due, in part at least, to the fact that throughout part of this experiment the birds in pens 3 and 4 came into egg production—a condition which seriously upsets the serum calcium values. During the laying period Parhon⁴⁰ found that the serum calcium of five pullets ranged between the values of 20.6 and 26.6 mg. per 100 c.c., while during moulting the values lay between 9.0 and 11.3 mg.

Histological examination.—The most valuable information of the experiment was obtained from the histological study of various tissue sections made immediately following necropsy.

Bone sections were made in the mid sagittal plane of the distal end of the femur. The histological appearance of the sections from the birds which received viosterol was practically identical. The cortices of the shafts were compact and of moderate thickness. The nature of the marrow varied somewhat, some shafts

being filled with red marrow exclusively, and in some fatty marrow predominated. In all there were bony trabeculae similar in structure to the compact bone of the shaft, but in addition there were irregular, continuous masses of bony matrix, the background of which had an affinity for hæmatoxylin. These suggested incompletely calcified areas.

The bone sections of the birds receiving parathormone were quite different. The trabeculae were surrounded by enveloping masses of dense

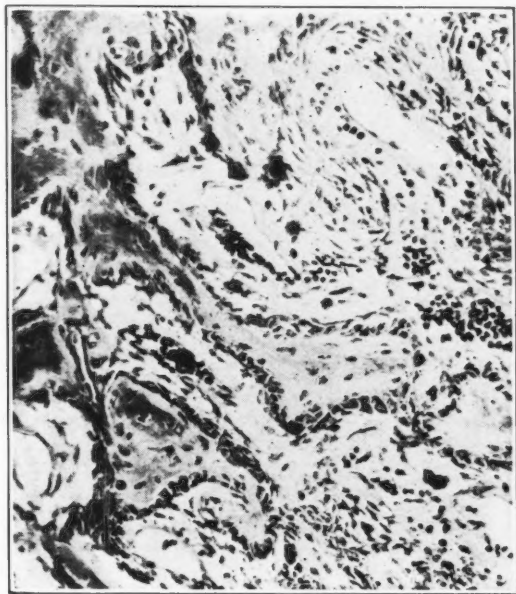


FIG. 1.—The distal end of normal femur showing normal bony trabeculae surrounded by hyperplastic osteoblasts.

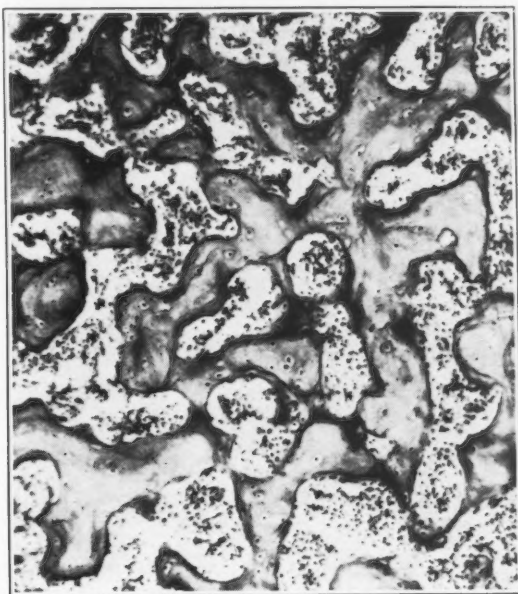


FIG. 2.—The distal end of femur showing dense trabeculation, with the trabeculae still cartilaginous rather than bony (456—3 c.c. 1,500 D. viosterol daily for six weeks).

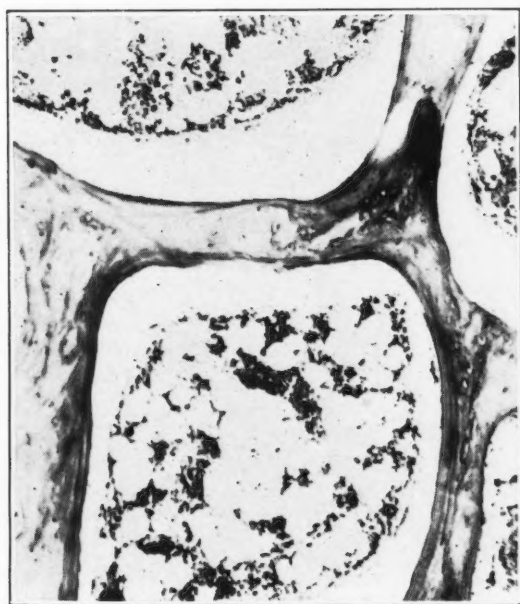


FIG. 3.—The distal end of femur, (higher magnification), showing rather more bony structure of the trabeculae than that shown in Fig. 2. (449—6 c.c. 1,500 D. viosterol daily for six weeks).



FIG. 4.—The distal end of femur, showing bony trabeculae surrounded by thick "periosteal" fibrosis. (445-10 units parathormone daily for six weeks).

fibrous tissue. All the sections showed this marked condition of fibrotic hyperplasia or osteitis fibrosa, and indicated that this fibrous tissue had developed from the bony trabeculae, but had failed to receive a deposit of calcium salts and had developed to a virtual periosteum.

The kidneys of the birds receiving parathormone (pens 3 and 4) were apparently

normal in all respects and no calcareous deposit was seen. The kidneys of the birds receiving viosterol (pens 1 and 2) on the other hand, showed marked changes. The glomeruli seemed reduced in number and those remaining were highly cellular and contracted from Bowman's capsules. The epithelium of the secretory tubules was swollen but generally intact. Scattered throughout the sections were masses of blue staining material, interpreted as calcareous deposits. In general, they were

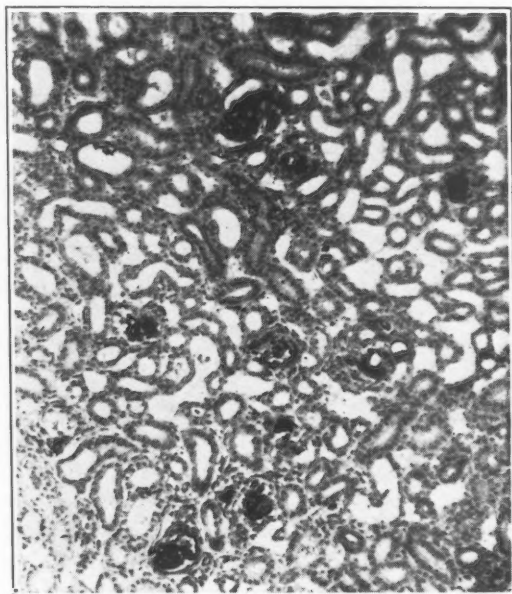


FIG. 5.—Section of chicken kidney, showing the extent of calcareous deposit within the kidney substance. (455—L.P.—3 c.c. 1,500 D. viosterol daily).



FIG. 6.—Section of chicken kidney (higher power) showing calcareous deposits which were apparently being developed within the epithelial cells of a secretory tubule. (455).

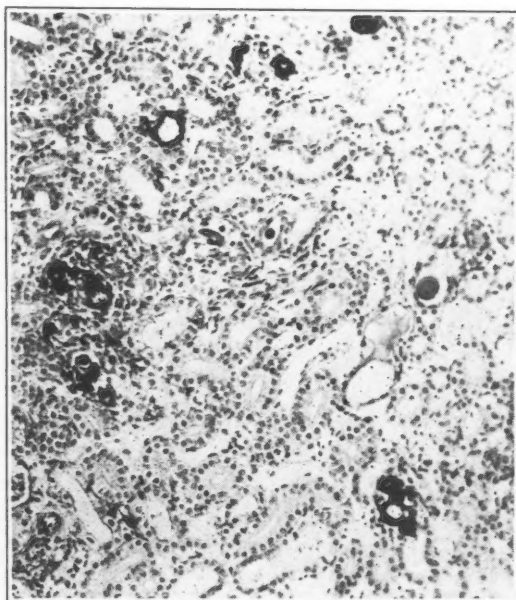


FIG. 7.—Chicken kidney (low power) showing the extent of calcareous deposit within kidney substance. At the upper left there is a ring of deposit which appeared to have been formed in the epithelium. At the middle right is a cast which in the original showed very distinctly the arrangement of concentric laminae. (449—6 c.c. 1,500 D. viosterol daily).

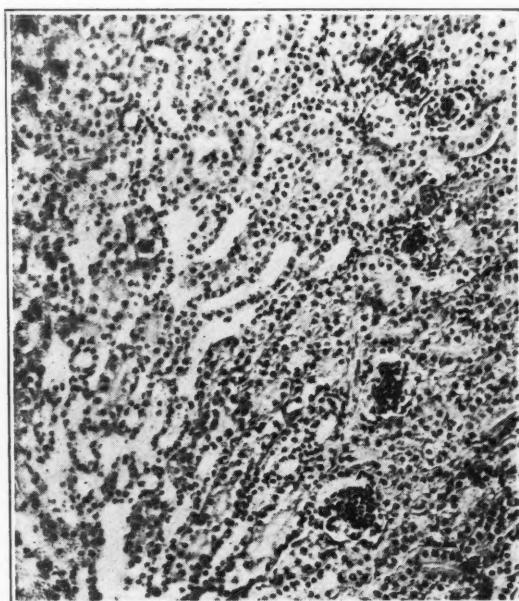


FIG. 8.—Chicken kidney; a representative section to show normal structure and the absence of calcareous deposit. (461—5 units of parathormone daily).

globular in contour and varied in size from that of an epithelial cell to that of a glomerulus. Some of the sections showed small globules of calcareous material within the cells of the secretory tubules. In a few instances calcareous casts were seen within the secretory tubule itself and surrounded by intact epithelium. The structure and position of these suggested that they were deposited within the cells of the secretory tubules and were laid down as successive concentric laminae. In some cases the masses were large enough to occlude the lumen. In a few instances there were found calcareous masses which appeared to be supplanting glomerular tufts. The absence of the epithelium, however, made precise identification of the location impracticable. The finding of globules within the epithelial cells of the secretory tubules suggested strongly that precipitation of calcium was incited at this site and continued in concentric laminae until the lumen was occupied by a cancellous "cast" and the epithelium was destroyed by pressure necrosis. Tubules which contained casts within intact epithelium were presumed to be simply receptacles for casts which had been formed at a site more proximal to the glomerulus. An alternative explanation would be that these had been due to precipitation of calcium from urine within the tubule. The presence of a cast occluding a tubule would be likely to cause necrosis of the proximal portion, including the glomerulus, and this would explain the apparent reduction in the number of glomeruli.

Sections of the aorta, small intestine and liver from these birds did not show abnormal histological appearances.

SUMMARY

1. The administration of massive doses of viosterol to chickens produced a condition of anorexia, loss of weight, extreme emaciation and finally death.

2. Hypercalcaemia resulted, and on histological examination heavy deposits of calcium were observed in the secretory tubules of the kidneys.

3. Histological examination of the femurs showed the matrix of the trabeculae to be normal, but suggested a low amount of calcareous deposit within it. The percentage of ash, calcium and phosphorus of the bones, however, was normal. The bone phosphatase ap-

peared to be present in less than the normal amount.

4. The daily administration of parathormone appeared to produce no ill effects in chickens, comparable to those produced by viosterol.

5. Histological examination of the femurs showed productive fibrosis of the bony trabeculae without evident deposition of lime salts in the hyperplastic tissue. The mineral constituents and the phosphatase of the bone were present in normal amount.

We wish to acknowledge the assistance of Dr. G. C. Cameron, of this Department, in the examination and interpretation of the histological preparations.

The photomicrographs were kindly prepared by Dr. R. S. Saddington, of the Department of Pathology of this University.

REFERENCES

1. BAUER, AUB AND ALBRIGHT, *J. Exp. Med.*, 1929, 49: 145.
2. BAUMGARTNER, KING AND PAGE, *Biochem. Zeit.*, 1929, 213: 170.
3. BEUMER AND FALKENHEIM, *Klin. Wehnschr.*, 1927, 6: 798.
4. BILLS AND WIRICK, *J. Biol. Chem.*, 1930, 86: 117.
5. BORS, *Zentrabl. Chir.*, 1927, 51: 3266.
6. BROWN AND SHOHL, *J. Biol. Chem.*, 1930, 86: 245.
7. COMEL, *Boll. soc. ital. biol. sper.*, 1930, 5: 738.
8. DEMOLI AND CHRIST, *Arch. exper. Path. Pharm.*, 1929, 146: 361.
9. DE TONI, *Boll. soc. ital. biol. sper.*, 1929, 4: 1256.
10. DIXON AND HOYLE, *Brit. M. J.*, 1928, 3540: 832.
11. DUGUID, *J. Path. Bact.*, 1930, 33: 697.
12. FERIZ, *Deut. med. Wehnschr.*, 1928, 54: 1498.
13. GYÖRGY, *Klin. Wehnschr.*, 1927, 6: 580.
14. HARRIS AND MOORE, *Biochem. J.*, 1928, 22: 1461; 23: 261, 1114.
15. HARRIS AND INNES, *Biochem. J.*, 1931, 25: 367.
16. HESS, LEWIS AND RIVKIN, *J. Am. M. Ass.*, 1928, 91: 783.
17. HESS, WEINSTOCK AND RIVKIN, *Proc. Soc. Exp. Biol. Med.*, 1929, 27: 55, 199; 1930, 27: 298.
18. HEUBNER, *Klin. Wehnschr.*, 1929, 8: 407.
19. HOLTZ, *Deut. med. Wehnschr.*, 1927, 53: 706; *Klin. Wehnschr.*, 1927, 6: 535.
20. HOYLE, *J. Pharm.*, 1930, 38: 271.
21. HOWARD AND HOYLE, *Biochem. J.*, 1928, 22: 713.
22. HALL AND KING, (1) *Poultry Science*, 1931, 10: 132.
23. HALL AND KING, (2) *Poultry Science*, 1931, 10: 259.
24. JAFFE AND BODANSKY, *J. Exp. Med.*, 1930, 52: 669.
25. JONES, RAPOPORT AND HODES, *J. Biol. Chem.*, 1930, 86: 267.
26. JONES AND ROBSON, *J. Biol. Chem.*, 1931, 91: 43.
27. KING AND HALL, *Biochem. Zeit.*, 1931, 229: 315.
28. KLEIN, *J. Am. M. Ass.*, 1929, 92: 621.
29. KNOFLACH, *Wien. klin. Wehnschr.*, 1928, 41: 739.
30. KREITMAIR AND HINTZELMANN, *Arch. exper. Path. Pharm.*, 1928, 137: 203.
31. KREITMAIR AND MOLL, *Munch. med. Wehnschr.*, 1928, 75: 637.
32. KROETZ, *Klin. Wehnschr.*, 1927, 6: 1171.
33. LAMBIE, KERMAK AND HARVEY, *Nature*, 1929, 123: 348.
34. LIGHT, MILLER AND FREY, *J. Biol. Chem.*, 1929, 84: 487.
35. LINDER AND HARRIS, *Quart. J. Med.*, 1930, 23: 195.
36. MARTLAND AND ROBISON, *Biochem. J.*, 1926, 20: 847.
37. MASSENGALE AND NUSSMEIER, *J. Biol. Chem.*, 1930, 87: 415.
38. PAGE, *Biochem. Zeitschr.*, 1930, 223: 222.
39. PAPPENHEIMER, *J. Exper. Med.*, 1930, 52: 805.
40. PARHON, *Comp. rend. soc. biol.*, 1926, 95: 785.
41. PFANNENSTIEL, *Klin. Wehnschr.*, 1927, 6: 2310.
42. POUCHER, *J. Mich. State Med. Soc.*, 1931, 4: 258.
43. PUTSCHAR, *Zeitschr. f. Kinderh.*, 1929, 48: 269.
44. RABL, *Deut. med. Wehnschr.*, 1929, 55: 63.
45. REBER AND WALKOFF, *Munch. med. Wehnschr.*, 1928, 75: 1071.
46. ROBISON, *Biochem. J.*, 1923, 17: 286.
47. SCHMIDTMAN, *Klin. Wehnschr.*, 1928, 7: 1106.
48. SCHWENHOLZ, *Klin. Wehnschr.*, 1929, 8: 1257.
49. SCHULTZ AND MEYER, *Klin. Wehnschr.*, 1930, 9: 1360.
50. SIMMONET AND TANRET, *Compt. rend. soc. biol.*, 1930, 190: 400.
51. SMITH AND ELVOVE, *U.S. Pub. Health Rep.*, 1929, 44: 1245.
52. SPIES AND GLOVER, *Am. J. Path.*, 1930, 6: 485.
53. STARLINGER, *Deut. med. Wehnschr.*, 1927, 53: 1553.
54. TAYLOR, WELD, BRANDON AND KAY, *Canad. M. Ass. J.*, 1931, 24: 763.
55. WATCHORN, *Biochem. J.*, 1930, 24: 631, 1560.
56. WENTZEL, *Arch. exp. Path. Pharm.*, 1928, 137: 215.
57. WINDAUS, *Nachr. ges. Wiss. Göttingen, Mathphysik. Klasse*, 1930, No. 1, 36 (C. A. 1931, 25: 132).

CEREBROSPINAL MENINGITIS COMPLICATED BY CEREBRAL HÆMORRHAGE

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CEREBRAL hæmorrhage as a complication of cerebrospinal meningitis is of rather rare occurrence. The majority of the reported cases have been noted by French physicians, but Fairley and Stewart¹ have also described cases in which hemiplegia has supervened.

In rare instances an intercurrent cerebral hæmorrhage may occur, especially in patients with pre-existing chronic nephritis. Denehy² reported three cases of cerebral hæmorrhage occurring during the course of cerebrospinal fever. At autopsy, chronic nephritis and degenerative changes in the blood vessels were found in all three. It was thought that the cerebral congestion brought about by the meningitis was the determining factor in causing rupture of a blood vessel. Smithburn *et al.*⁵ report 21 per cent of intraventricular hæmorrhage in a series of 144 epidemic cases. Small hæmorrhagic areas are occasionally found at post-mortem in acute fatal cases.

Meningitis, in older patients, may occasionally simulate cerebral hæmorrhage. Similarly, cerebral hæmorrhage may occasionally resemble meningitis. However, the age of the patient, the presence of a hemiplegia, and the absence of rigidity of the neck, Kernig's sign, or pyrexia will permit a correct diagnosis. If, on the other hand, the hæmorrhage be basal, the clinical picture may closely resemble that of meningitis. The patient may then be stuporose or comatose and show general muscular rigidity, including stiffness of the neck and a positive Kernig's sign. Fairley and Stewart¹ described such a case, in which internal hydrocephalus, due to the obstruction of the foramina of Magendie and Luschka, was also present. In cases of this kind a correct diagnosis can only be made by means of a lumbar puncture.

Meningeal hæmorrhage will frequently give rise to a positive Kernig's sign, but the temperature is usually subnormal and rigidity of the neck is absent. Giraud and Blouquier de Claret³ report a case of cerebrospinal meningitis associated with meningeal hæmorrhage in the right

paracentral area. They suspected an associated luetic disease of the arteries. Cases of cerebrospinal meningitis have been reported in which cerebellar hæmorrhage occurred. Sainton and Roullin report such a case occurring in a soldier 27 years old. At autopsy, in sectioning the brain, a recent hæmorrhagic focus the size of a small hen's egg was found in the centre of the left lobe, involving the dentate body, and apparently due to rupture of the artery of this nodule.

CASE REPORT

The case I wish to present is that of a young Canadian male, aged 36 years, who was admitted to the Montreal General Hospital on February 1, 1929, complaining of headache and vomiting; pains in back, lower spine and legs.

Family history.—Irrelevant.

Personal history.—A salesman. He had always resided in Montreal and vicinity; was subject to head-colds and had a deviated nasal septum. There were no headaches or dizziness prior to the onset of his illness. He had not been subject to sore throats. There was no history of venereal disease, night sweats or painful joints. He had been gaining weight.

History of illness.—This began four days before admission with occipital headache, which came on very suddenly, followed by nausea and vomiting. The following day he got up and had his teeth x-rayed. That night he was completely exhausted. The headache persisted. The next day he felt very irritable and nervous, and was up pacing the floor; the headache had become worse. The day before admission to hospital he was unable to get out of bed. He became delirious and vomiting reappeared. Later, he became unconscious and when seen by a doctor, the same evening, there was definite rigidity of the neck. He was recommended for admission to hospital.

Physical examination.—(February 1, 1929). Pulse 80; respirations 12; temperature 100° F. The patient was a moderately well developed and nourished male, lying quietly in bed. He complained of sub-occipital headache and preferred to keep his eyes closed as the light hurt them. There was no diplopia; the pupils equal and active; the movements of eyes equal in all directions. The neck was quite rigid. There was no tenderness over sinuses or antra. The nasal mucosa was a little injected and the septum deviated to the right. The naso-pharynx was a little injected. The tonsils were injected, but no exudate could be expressed. Blood pressure, 138/90. The superficial glands, respiratory, and cardiovascular systems were negative. The abdomen was negative, except that there were a few scattered reddish papules in both axillæ and over abdomen which were not unlike "rose spots." The spleen was not palpable nor was it enlarged to percussion.

The patient answered questions rationally, but was hazy as to time and place. The reflexes were active and equal. The knee-jerks were present and equal; no Babinski or Oppenheim reactions present; no definite

Kernig sign. The ocular fundi were negative, the discs being clear, and the vessels normal in outline. The urine analysis was negative. The blood Wassermann was negative. The leucocyte count was 13,000 per c.mm.

Shortly after admission a lumbar puncture was done and the cerebrospinal pressure found to be 10 mm. of Hg. Fifteen c.c. of turbid fluid were withdrawn. This showed polymorphonuclear cells predominating, and one cell showed an intracellular, Gram-negative, biscuit-shaped diplococcus. A specimen of the spinal fluid was sent to the bacteriological laboratory, but no organism was isolated at this time. Following the lumbar puncture, 15 c.c. of Lederle's polyvalent antimeningococcic serum were given intrathecally, and 30 c.c. intravenously.

The day after admission the patient's condition was much the same. The rigidity of the neck was quite marked and there was now the suggestion of a bilateral Kernig sign. Lumbar puncture was repeated. The pressure was within normal limits. Fifteen c.c. of turbid fluid were withdrawn, and 15 c.c. of Lederle's polyvalent serum were administered intrathecally; also 30 c.c. intravenously. The "rose spots" which were noted the day previously turned out to be ordinary pimples.

From February 3rd to February 7th there was no great change in the patient's condition. He received a daily intrathecal injection of 30 c.c. of polyvalent serum after the withdrawal of approximately 35 c.c. of turbid spinal fluid. The cell count of the fluid averaged 230 per c.mm., the greater majority of these being polymorphonuclears. The pressure of the spinal fluid was within normal limits. On each occasion a specimen of the fluid was sent to the bacteriological laboratory, and on February 6th, ten days after the onset of the disease, a culture of Gram-negative diplococci was obtained. This was the only occasion on which a culture was obtained, although a daily specimen of spinal fluid was cultured.

During this time, the temperature was between 98.4° F. and 100.2° F., and the blood pressure 130/90. A Von Pirquet test was done and this was negative. A Widal agglutination test was also negative. On February 6th, there were definite pinkish papules over thorax and abdomen. On February 8th the patient's condition was less satisfactory. His temperature had risen to 101° F. His blood pressure was 140/75 and he was irrational. The neck was quite rigid and the Kernig sign well marked. Examination of the fundi showed the discs to be clear. On this date it was found impossible to get into the spinal canal, and 30 c.c. of polyvalent serum were given intravenously.

The cisterna magna was punctured on February 9th and 30 c.c. of serum injected. The fluid continued to be turbid, and the patient's general condition remained unchanged. There was still an intermittent and remittent type of temperature.

By the following day, he was very toxic. His blood pressure was 160/90. The fundi were negative. Kernig's sign was present on both sides, and rigidity and retraction of neck marked. Thirty c.c. of serum were given intravenously and three hours later the patient had what appeared to be a delayed anaphylactic reaction. Three hours after this, 25 c.c. of serum were given by the cisterna magna route. Petechiae had now appeared over the upper part of the thorax anteriorly. The spinal fluid was under 28 mm. Hg. pressure, and the cell count showed 2,240 cells per c.mm. The great majority of these were polymorphonuclears. The leucocyte count at this time was 13,800 per c.mm.

On February 11th, the patient was very drowsy. There was a suggestion of a Cheyne-Stokes type of respiration; pulse 80, temperature 102.2° F., blood pressure 150/80. The pupils were moderately contracted and responded sluggishly to light. There was a suggestion of divergent strabismus. Bilateral deafness was also noted. A lumbar puncture was done; 30 c.c. of turbid fluid withdrawn under pressure of 22 mm. Hg.

and 30 c.c. of serum injected. The cell count was 2,400 per c.mm.

On February 12th and 13th there was a definite improvement in the patient's condition. The temperature dropped to normal; the blood pressure remained at 150/100. Lumbar punctures were done each day; the pressure was at 36 mm. Hg. and the cell count was down to 400 per c.mm. The polyvalent serum had been changed on February 12th from Lederle's to the Connaught Laboratory product.

By February 15th the deafness had practically disappeared and the rigidity of the neck was less marked. Blood pressure 140/90. The temperature had risen a little to 100.4° F. The pulse was 80 per minute. There were no pathological reflexes.

The condition on February 16th was unchanged. On each day he had been given from 20 to 30 c.c. of polyvalent serum intrathecally. The pressure remained around 22 mm. Hg. and the cell count varied from 200 to 600 per c.mm.

During the next two days he was more irrational, but there was no increased rigidity of the neck. A daily lumbar puncture was done; the pressure was 22 to 24 mm. of Hg. Twenty and thirty c.c. polyvalent serum, respectively, were given each day. The blood pressure was 150/90 and the temperature had risen to 101.2° F.

On the morning of the 19th there was little change except that the patient was quite irrational and numerous petechiae had appeared over the body and limbs. The temperature was 99° F., blood pressure 150/90, and the pressure of the spinal fluid 20 to 22 cm. Hg. Forty c.c. of turbid fluid were withdrawn and 30 c.c. of polyvalent serum were administered. The cell count was 400 per c.mm. The fundi were negative.

By 8.30 p.m. he was quite irrational and showed the muttering type of delirium. The head was well retracted, and the Kernig sign quite marked. The eyes seemed more prominent than formerly. The left pupil was fixed to light and dilated. The right pupil was moderately contracted and reacted very sluggishly to light. The left disc was clear, but one could not obtain a good view of the right fundus. The pulse was 120, the temperature had mounted to 102.4° F. and the blood pressure was 200/100. No paresis of the limbs was noted. A second lumbar puncture was done. Unfortunately, a reading of the pressure could not be obtained, as the manometer connections would not work, but the fluid literally poured out of the needle. Sixty to seventy c.c. of very turbid yellowish fluid were withdrawn, and 30 c.c. of serum injected. After the lumbar puncture, the patient's condition rapidly grew worse and he died. He had been given a total of 120 c.c. of polyvalent serum and 495 intrathecally.

The clinical impression was that there had been a rather sudden plugging of the foramen of Majendie, with a resulting acute internal hydrocephalus, in a patient suffering from cerebrospinal meningitis. The illness had lasted 23 days, and though at first the man seemed to show definite improvement, this was not continued, and the disease ran its course to a fatal termination, in spite of the administration of serum obtained from two different sources.

Autopsy findings.—With the exception of the changes in the central nervous system there were few pathological findings and none of these could be specifically associated with cerebrospinal fever. The arteries generally did not show any more arteriosclerosis than is usual in an individual of his age, and there was no evidence of syphilis.

The pathologist's report on the central nervous

system was as follows: "The dura is not abnormally adherent. The great longitudinal sinus and the sinuses at the base of the skull contain post-mortem blood clot. The middle ears and mastoids are normal. The meninges covering the cerebrum are somewhat clouded, and along the larger blood vessels there is a small amount of acute purulent exudate. This increases as the base of the brain is approached. The convolutions are flattened and the sulci are shallow. The gross anatomical markings of the base of the brain are distinguishable, but they are somewhat obscured by an acute purulent exudate. This is most marked about the optic chiasm, and is also present in the meninges of the cerebellum, especially throughout its anterior superior half. A large fresh blood clot in the right lateral ventricle surrounds and completely obscures the right choroid plexus and forms a cast of this ventricle (Fig. 1). There is a similar blood clot in the left lateral

the meninges. This inflammatory reaction is most marked at the base of the brain. One of the sections of the cerebellum shows a small acute sub-meningeal hæmorrhage.

"Several sections were made through the ependyma and peri-ependymal tissues of the lateral ventricles. They all show varying degrees of the same kind of lesion. The vessels are congested and most of them are surrounded by a wide zone of lymphocytes and endothelial cells. There are also small areas of necrosis and sub-ependymal infiltration with inflammatory cells (Fig. 3). Section through the hæmorrhagic area in the right lateral ventricle shows fresh hæmorrhage into the tissues,



FIG. 1.—Longitudinal section of the brain exposing the floor of both lateral ventricles. Note the large hæmorrhage in the right lateral ventricle. There is a small amount of blood in the left ventricle which has passed in from the right side.

ventricle which is continuous with the large hæmorrhage into the right lateral ventricle. In the superior and lateral aspect of the posterior third of the right lateral ventricle there is a small elevated area of softening, adherent to which is a recent blood clot (Fig. 2). A transverse section through this area shows a small fresh clot, adherent to the ependyma, continuous with a similar fresh hæmorrhage into the peri-ependymal tissues. This hæmorrhage occurs in an area $1 \times 2 \times 2.5$ cm. which also shows small yellowish areas of necrosis and very widely dilated blood vessels. The dilated blood vessels occur in a small group and the largest one is 0.6 cm. in diameter. Neither hæmorrhage, dilated blood vessels nor areas of necrosis are seen elsewhere.

"The anatomical diagnosis is: acute cerebrospinal meningitis; widely dilated blood vessels in a localized area of necrosis and hæmorrhage into the peri-ependymal tissues of the right lateral ventricle; a large hæmorrhage into the right lateral ventricle with a small hæmorrhage into the left ventricle.

Sections for microscopical study from the hemispheres, the pons, the medulla and the cerebellum all show dilatation of the vessels and an exudate of polymorphonuclear leucocytes, wandering cells and serum into



FIG. 2.—The roof of the right lateral ventricle at the site of hæmorrhage into the sub-ependymal tissues. Note the blood clot adherent to the roof of the ventricle and the hæmorrhage into the sub-ependymal tissues at "M".

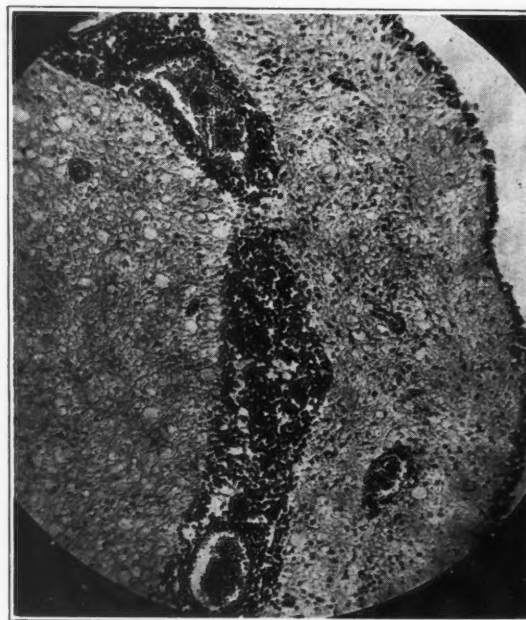


FIG. 3.—This shows the lining of the right lateral ventricle and the sub-ependymal tissues, anterior to the site of hæmorrhage. Note dilatation of the blood vessels with the very wide collar of infiltration of white blood cells.

areas of necrosis and large, very widely dilated blood vessels. Most of the dilated blood vessels are longitudinal, transverse and tangential sections of arteries which appear to be from a single tortuous artery. They show



FIG. 4.—Low power microphotograph just without the edge of the site of hæmorrhage in the sub-ependymal tissues and the roof of the right lateral ventricle. It shows very widely dilated blood vessels and marked arteriosclerosis with deposition of lime salts in the vessel wall.

marked arteriosclerosis with quite extensive deposit of lime salts. (Fig. 4).

"The microscopical diagnosis was: small cerebellar hæmorrhage; sub-ependymal inflammation and necrosis and perivascular inflammation; arteriosclerosis of an artery in the area of the sub-ependymal hæmorrhage in the right lateral ventricle."

REMARKS

The sequence of events in so far as the sub-ependymal hæmorrhage is concerned can be explained as follows. Sub-ependymal inflammatory lesions accompanied by necrosis are not uncommon in cerebrospinal meningitis. In this case one occurred about an artery which shows marked arteriosclerosis. The lack of support of this artery which has resulted from necrosis of the surrounding brain has resulted in a rupture of the artery, hæmorrhage into the surrounding brain tissue, and rupture into the lateral ventricle.

The author is deeply indebted to Dr. L. J. Rhea and members of the staff of the Pathological Department, Montreal General Hospital, for the preparation of the pathological report and micro-photographs.

REFERENCES

1. FAIRLEY AND STEWART, Cerebrospinal Fever, Commonwealth of Australia Service Publication, No. 9, 1916.
2. DENEHY, *Brit. M. J.*, 1916, 2: 684.
3. GIRAUD AND DECLARET, *Progrès méd.*, 1921, 36: 471.
4. SMITHBURN *et al.*, *J. Am. M. Ass.*, 1930, 95: 776.

PATHOLOGY OF POLIOMYELITIS*

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STRICTLY speaking, a discussion of the pathology of poliomyelitis should embrace the consideration of the infecting agent, the path of invasion, the clinical pathology and morbid anatomy, including both gross and microscopic lesions. Because of the limited time at our disposal, and because we wish to devote more time to a discussion of the microscopic findings in this disease, we shall pass rather hurriedly over the other aspects of the subject.

The infecting agent.—It is now generally accepted that the causative factor of this disease is a filterable virus possessing a peculiar affinity for the nervous system, and pathogenic only for

man and monkeys. This can be preserved for a long time in 50 per cent glycerine. In infected animals it is most readily demonstrated in the nervous system, of which the spinal cord usually harbours the largest amount. Following intracerebral injection in the monkey, it has been found with some degree of regularity in the tonsils and mucous membrane of the nasopharynx, but only on rare occasions in other organs of the body or in the blood stream.

The path of invasion.—Some authors, including Wickman,¹ in 1911, and Kling,² as late as 1928, have held that, because of the frequency with which the lower extremities have been involved, the virus enters the body by the intestinal tract. This view has not been at all generally accepted, and only recently Fairbrother and Hurst³ have shown that in a series

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of 80 monkeys inoculated intracerebrally or intranasally with poliomyelitis virus muscular weakness was first observed in the lower extremities in 70 per cent of cases, in the upper extremities in only 10 per cent of cases, and in the face muscles in $2\frac{1}{2}$ per cent, while in the remaining $17\frac{1}{2}$ per cent the sequence was not observed, as weakness of the legs, arms and trunk muscles developed over-night. Thus the view that frequent involvement of lower extremities indicates an intestinal portal of entry is no longer tenable.

With few exceptions the majority of observers have been, and still are, agreed that the virus enters the body through the mucosa of the upper respiratory passages, particularly that of the nasopharynx. There is not the same agreement, however, as to the path by which it arrives at the anterior horn regions of the spinal cord, where its greatest damage is done. According to Flexner and Amos^{4, 5} the common path is from the nasopharynx to the olfactory lobes of the brain, thence to the cerebrospinal fluid, by which it is conveyed to the substance of the cord. They admit the possibility, however, in exceptional cases, of other modes of infection, such as by way of any nervous pathway, or even by the blood stream, in which case it reaches the subarachnoid space and is carried by the cerebrospinal fluid by way of the perivascular sheaths to the substance of the cord. In support of this meningeal pathway is the frequency with which signs of meningeal irritation are observed in the pre-paralytic stage of the disease, and the presence of inflammatory reaction in the meninges in experimentally produced poliomyelitis in monkeys, or in patients dying of this disease. Recently Fairbrother and Hurst,³ working with monkeys, have advanced the view that the "spread of infection to the brain-stem and cord occurs by way of the axis-cylinders, and this appears to be the route usually taken to other parts of the central nervous system; meningeal spread is, however, possible, and probably always plays some part in the local dissemination of the infection around the site of inoculation." They further conclude that "meningitis is, therefore, not the primary lesion of the disease, which begins as a primary degeneration of nerve cells accompanied by inflammation in the interstitial tissues." In support of this view these authors not only mention the difficulty

with which the virus is recovered from the cerebrospinal fluid, as compared with the substance of the spinal cord, but by sacrificing monkeys at twenty-four hour periods after the intracerebral inoculation with poliomyelitic virus were able to follow the progress of the virus through the brain to the cord, and at the same time observe the advance in the inflammatory reaction. It is just possible that further investigation along these lines may show that the passage of the virus from nasopharynx to cord is not confined to either of these two routes. In any case, by whatever route the virus arrives at the anterior horns of the cord, arrive there it does, and it is there that it is capable of doing irreparable damage, as we shall presently show. Before doing so, however, let us consider briefly the clinical pathology of poliomyelitis.

Clinical pathology.—Without question the most valuable diagnostic aid in the pre-paralytic stage is the examination of the cerebrospinal fluid. Lumbar puncture at this time reveals a spinal fluid under some increase of pressure; the fluid is usually colourless and clear with a cell count ranging anywhere from 10 up to 2,000 or 3,000; the average, however, is from 150 to 1000 cells. The differential count in the early stages usually reveals about 50 per cent polymorphonuclear leucocytes and 50 per cent lymphocytes. These proportions tend to change, however, so that later in the course of the disease the relative number of lymphocytes increases to about 90 per cent. The globulin is increased, but the chlorides and sugar content remain unchanged.

Morbid anatomy.—As a rule at autopsy the gross findings are not at all marked. Outside of the central nervous system, one may find some hyperplasia of the lymphoid tissue of the spleen, mesenteric glands and Peyer's patches. Usually, too, there is some cloudy swelling of the liver and kidneys. The significance of these findings is not altogether clear. To some it is an indication that the infection is at first general, and that the virus settles later in the central nervous system. Others hold that these general changes simply indicate such a toxæmia as is commonly seen in other types of febrile disease. So far as the central nervous system is concerned, frequently all that may be seen is a diffuse reddening of the meninges with a rather definite congestion of practically all of the meningeal vessels.

These changes are found throughout both cerebral and spinal meninges. Cross sections of the cord at times reveal no gross pathological change whatever. In other instances, however, there is definite softening of the anterior horn regions which stand out with varying degrees of redness depending upon the amount of vascular congestion and hæmorrhage.

The interesting pathological findings, however, are brought out on microscopic examination. Outside of the central nervous system, the gross appearances of lymphoid hyperplasia and cloudy swelling of parenchymatous organs are confirmed. In the central nervous system, however, microscopic lesions are found which may extend from the basal ganglia of the brain to the lower end of the cord. In general these changes show a great deal of similarity, the differences being largely one of degree. In order to better correlate the pathological findings with the clinical symptoms it is convenient to describe the changes as they are found in the three stages of the disease, namely, the pre-paralytic stage, the paralytic stage, and the stage of healing.

Clinically, the pre-paralytic stage is characterized by irritation of the meninges, as is

at this stage suggest that there is, at least, some degree of meningitis. This is confirmed on microscopic examination of sections of cord, by the congested meningeal vessels and the presence of varying amounts of cellular infiltration of the meninges.

In the paralytic stage the changes in the cord become quite marked. The main cause of the paralysis appears to be definite injury to the anterior horn cells as the result of a specific neurotoxin produced by the virus. In addition to this, however, the paralysis is, no doubt, aggravated by pressure from the oedema and cellular infiltration of the adjacent interstitial tissue. The lesions in the spinal cord, while most marked in the anterior horn regions, are by no means confined to these areas, and may be grouped under three headings, namely vascular, interstitial, and degeneration of the anterior horn cells.

The vascular changes include congestion of the vessels, perivascular infiltration with lymphocytes, some polymorphonuclear leucocytes, and hæmorrhage. This vascular congestion is most marked in the anterior horn regions where the vessels are most numerous, but is found also in other parts. The peri-

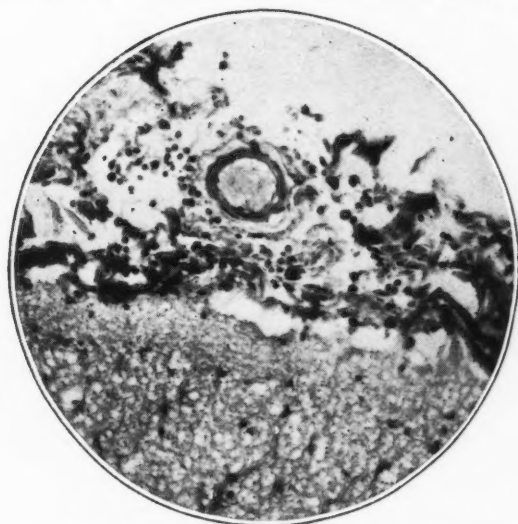


FIG. 1.—Spinal meninges (medium power). Meningitis.

shown by increased reflexes, and pain in the back and neck, particularly on flexion of trunk or neck. As patients do not die in this stage, we have no human material with which to illustrate the findings, but one can feel reasonably sure that such changes as are found in experimentally produced poliomyelitis in monkeys are similar to those found in man. The clinical picture, together with the spinal fluid findings



FIG. 2.—Medulla (low power) congested vessels; hæmorrhage; perivascular infiltration.

vascular infiltration is quite marked and constitutes at times a very clear cut picture. Frequently, this cellular collar can be traced along the vessels to the meninges, and this picture has been interpreted by some as being an indication of the passage of the virus from the meninges into the substance of the cord. Fairbrother and Hurst,³ on the other hand,



FIG. 3.—Anterior horn region (medium power) perivascular infiltration; anterior horn cell fairly well preserved.

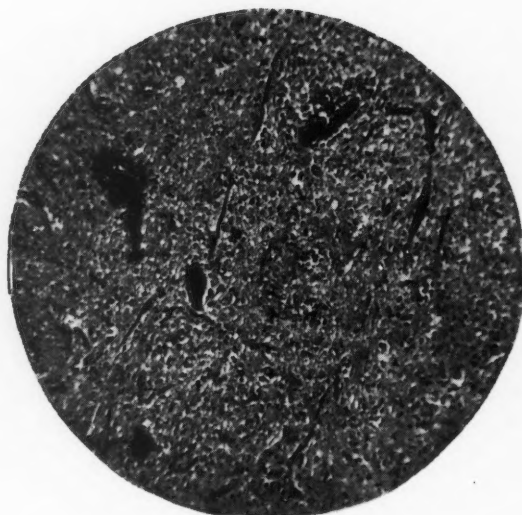


FIG. 4.—White matter (low power). Perivascular and diffuse infiltration.

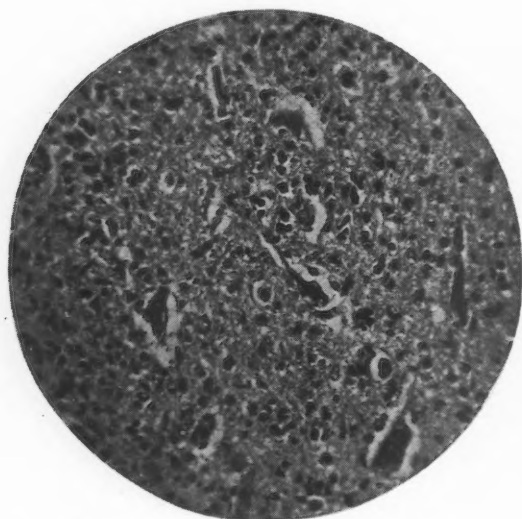


FIG. 5.—Anterior horn region (medium power). Anterior horn cells shrunken; diffuse polymorphic infiltration.

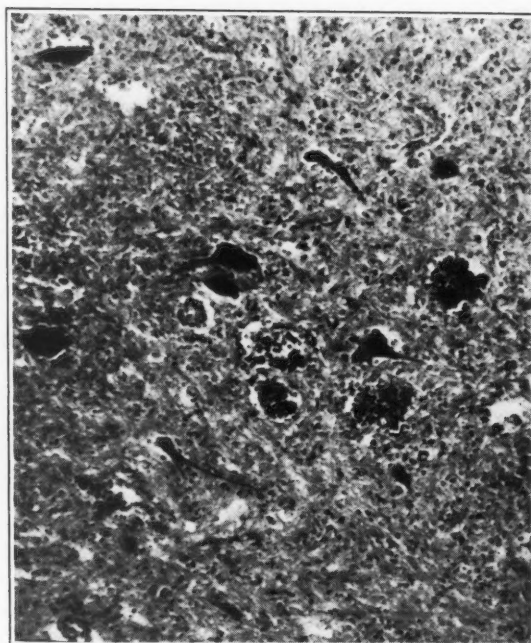


FIG. 6.—Anterior horn region (medium power). Anterior horn cells shrunken, degenerating; neurophagocytosis.

draw attention to the fact that the lymph drainage is from the substance of the cord along the perivascular sheaths out to the meninges, and they are of the opinion that the infiltration of cells in the meshes of the meninges represents merely an overflow of cells from the central portion of the cord along the vessels to the surface. Hæmorrhage into the substance of the cord is by no means constant, and it is probably only in the more severe and fatal types that this phenomenon appears. The interstitial changes consist chiefly of œdema and a more or less diffuse infiltration of cells, chiefly lymphocytes and polymorphonuclears. The most important change of all, however, is the degeneration of the anterior horn cells, with

its resulting paralysis. This may vary from only a slight chromatolysis to a complete neurophagocytosis. The picture produced by this phenomenon is, at times, most striking.

During the stage of healing and recovery the œdema disappears, the infiltrating cells again enter the circulation, the phagocytes continue their scavenging work, the glial cells proliferate, with the resulting scar tissue in which few or no anterior horn cells remain depending upon the severity of the disease.

In conclusion, we would say, that the one important lesson that the microscopic study of

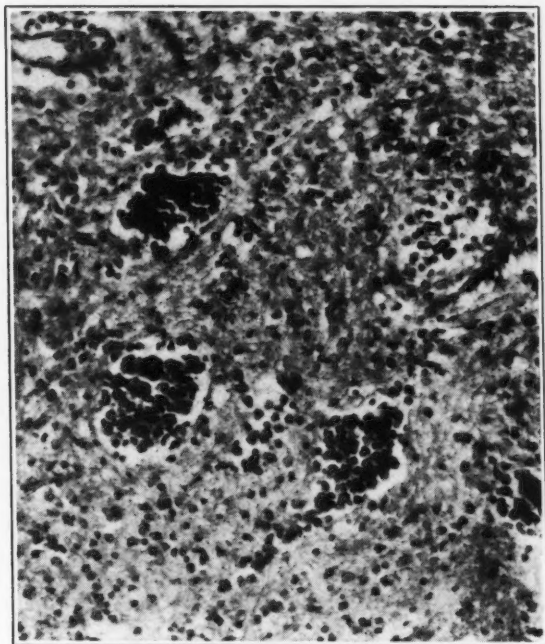


FIG. 7.—Anterior horn region, same as Fig. 6 (higher power). Anterior horn cells completely destroyed; neurophagocytosis.

these lesions teaches is this. If the administration of convalescent poliomyelitis serum is to be of value at all, it must be administered early in the disease, before the anterior horn cells have been destroyed, or, in other words, before the paralysis has developed.

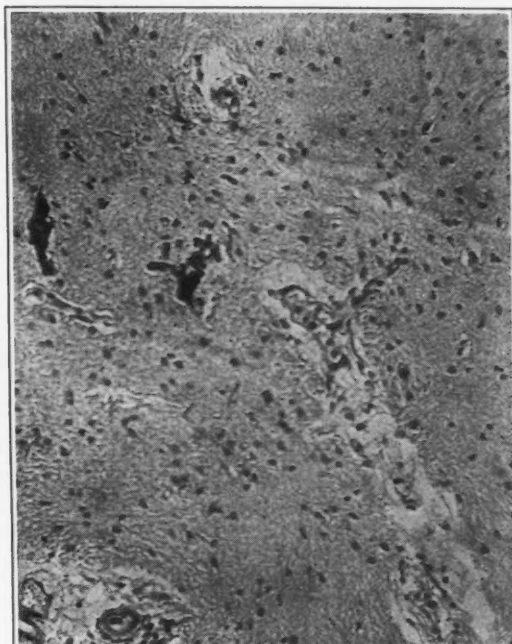


FIG. 8.—Anterior horn region (low power). Death from pneumonia, 2 years after acute attack. Almost complete residual paralysis both legs; remnants of 2 anterior horn cells still visible.

REFERENCES

1. WICKMAN, Die akute Poliomyelitis bzw. Heine-Medinsche Krankheit, Berlin, 1911.
2. KLING, *Bull. de l'Off. Internat. d'Hyg. Pub.*, 1928, 20: 1779.
3. FAIRBROTHER AND HURST, *J. Path. & Bact.*, Jan., 1930, 33: 17.
4. FLEXNER AND AMOSS, *J. Exp. Med.*, 1914, 20: 249.
5. AMOSS, Filterable viruses, Williams and Wilkins, Baltimore, 1928, p. 159.

EROSION HÆMORRHAGE FROM THE INTERNAL CAROTID ARTERY

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PROFUSE hæmorrhage from the pharynx or ear, arising from erosion of a large blood-vessel, is mentioned in most text-books as a possible but rare complication of retro-pharyngeal abscess. During the past six years there have been at the Sick Children's Hospital 8 cases of this type of hæmorrhage from the internal carotid artery in 100 cases of acute retro-pharyngeal abscess, a proportion of 8 per cent. As many patients with retro-pharyngeal abscess are never admitted to hospital, and as most who suffer from severe recurrent hæmorrhages are, it is realized that these figures do not represent the true incidence of bleeding, but they do show, at least, that the condition is not excessively rare.

Cases of this nature have been reported from

time to time in the literature, but they have been presented, for the most part, as pathological oddities, and little attempt has been made to describe the clinical picture or to discuss treatment. Our series of eight cases is a comparatively large one, and the similarity in them all of the clinical course and pathological findings is so striking as to make us believe that we have to deal with a clinical entity that presents practically always the same main features and demands the same treatment. We have come, too, to believe that, from the picture presented, we should be able to diagnose the bleeding, even at its onset, as from the internal carotid artery, and should be able to institute rational treatment at a stage when it may avert the otherwise invariably fatal outcome.

CASE 1

E. B., female, aged 18 months. Three weeks before admission to hospital, the child developed a sore throat. Two weeks later a swelling appeared on the left side of the neck, which gradually decreased in size. On the morning of admission there was a profuse hæmorrhage from the mouth, and about ten hours later a second similar profuse hæmorrhage. Both attacks of bleeding stopped spontaneously, and following the second attack the child was rushed to the hospital, but died a few minutes after arrival there.

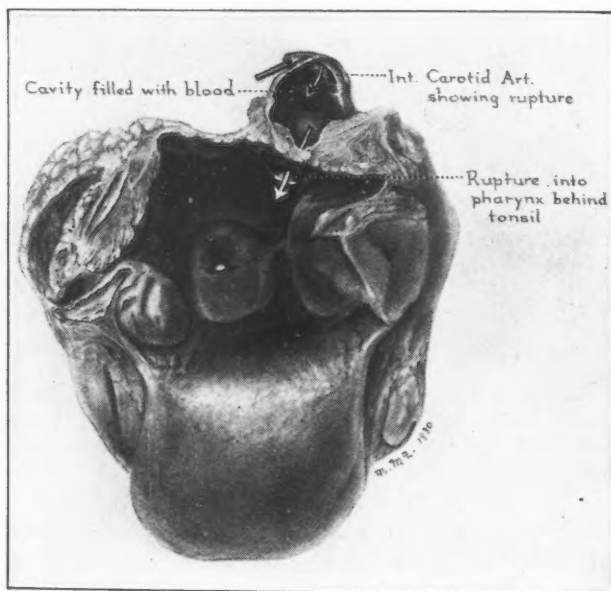


FIG. 1.—Autopsy specimen from Case 1, viewed from the front and above, showing the location of the erosion of the internal carotid artery and of the rupture through the pharyngeal wall.

Autopsy showed a long jagged opening in the internal carotid artery about half an inch below the base of the skull (Fig. 1). This opening communicated with a cavity about the size of a hazel-nut, which lay in front of the artery, between it and the pharynx, and which in turn communicated with the pharynx by a slit-like opening behind and above the tonsil. The cavity contained a good deal of blood-clot and its walls were rough and irregular in outline.

CASE 2

F. T., female, aged 14 months. Eight days before admission to hospital the patient developed a nasopharyngitis, with swelling on both sides of the neck. The swelling on the left side of the neck enlarged considerably during the next few days. On the day before admission to hospital, pus began to discharge from the left ear. On the morning of admission there was a profuse hæmorrhage from this ear, which stopped when the ear was tightly packed. On the same evening there was a second profuse hæmorrhage and the child was brought to the hospital.

The general condition was poor, and the temperature was 101°. An area of granulation tissue could be seen on the anterior wall of the external auditory canal, close to the drum, and the bleeding appeared to come from this point. There was no swelling in the throat, but considerable swelling on the outside of the neck on the left side.

The child continued to bleed at intervals from the left ear. The swelling of the neck became smaller, but a swelling appeared on the left lateral wall of the pharynx, pushing the soft palate and tonsil downward and inward. On the fourth day after admission, an

incision was made into this swelling. No pus was obtained and there was no undue hæmorrhage. The bleeding from the ear continued intermittently. The temperature remained high (about 104°) and the general condition became gradually worse. The hæmolytic streptococcus was grown from both the ear and from the blood. On the sixth day after admission, there was a profuse hæmorrhage from the incision in the pharynx, and a few hours later the child died.

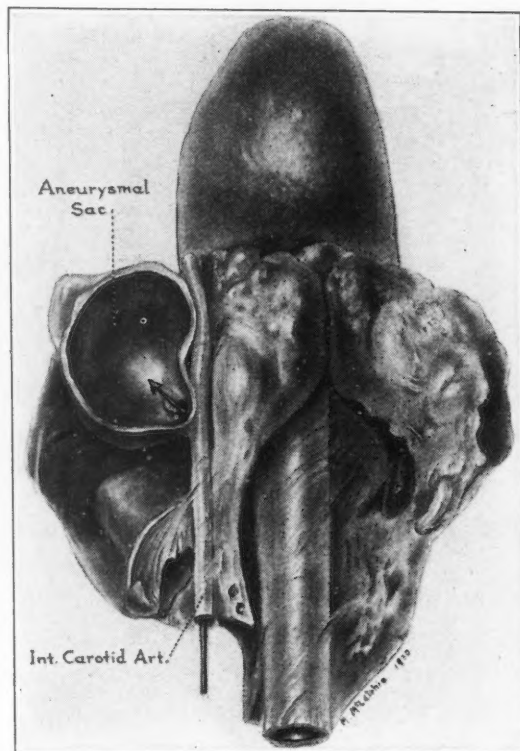


FIG. 2.—Autopsy specimen from Case 2, viewed from behind, showing the formation of a well-defined aneurysmal sac.

Autopsy showed an erosion of the internal carotid artery about one inch above the bifurcation (Fig. 2). This opening communicated with a false aneurysmal sac, smooth, well defined, and lined with fibrin. This sac was situated in front of and lateral to the artery, and was about an inch and a quarter in diameter. It had ruptured in two places, one into the incision through the pharyngeal wall and the other at its top, where there was an erosion through the petrous portion of the temporal bone, opposite the drum but chiefly within the middle ear.

CASE 3

B. L., female, aged 17 months. One week before admission the left side of the neck became swollen and the child had some difficulty in swallowing. After two or three days the swelling became less but the difficulty in swallowing persisted. Two days before admission the swelling in the neck increased rather rapidly in size, and the child had two profuse hæmorrhages from her mouth, each stopping spontaneously. On the morning of admission she had a third hæmorrhage.

On admission she was pale and looked sick. The temperature was 103°. The left side of the neck was considerably swollen and an irregular opening could be seen on the posterior pharyngeal wall just behind the left tonsil.

The child was transfused and shortly afterwards had a further profuse hæmorrhage. Under ether, the

internal carotid artery was then tied just above the bifurcation. No change in the breathing was noted at the time, and there were no convulsions. At the end of the operation the child was again transfused.

On recovery from the anæsthetic, a complete right-sided hemiplegia was noticed, without sensory involvement. There was, however, no further bleeding from any source. The incision in the neck became infected, the organism grown being the hæmolytic streptococcus. The wound gradually healed, however, and the patient was discharged from hospital a month after operation, by which time the face had recovered completely and the arm was used a little, but the leg not at all. She was last seen a year later, when the arm had apparently recovered completely. The leg was still a little spastic and the knee-jerk increased, but the child walked with a limp that was barely perceptible. We have since lost sight of her.

CASE 4

J. R., male, aged 2½ years. The illness commenced with stiffness and pain on the right side of the neck. After about a week, the right side of the neck became considerably swollen, the breathing became difficult, and the child seemed very sick and feverish. Three days later, on the day before admission to hospital, there was a profuse hæmorrhage from the mouth, and following that, until the time of admission, several hæmorrhages, smaller in amount.

On admission, the child was badly exsanguinated. An opening was seen in the posterior wall of the pharynx, behind and below the right tonsil, with no active bleeding at the time. The child was transfused and the bleeding commenced again. Under ether anæsthesia, the right internal carotid was exposed, and an opening found in its wall about an inch above the bifurcation. Ligatures were placed above and below this opening. There was no further bleeding, but as soon as the first ligature was tied the character of the respirations changed. They became shallower and slower, and in a few minutes ceased. Artificial respiration was applied and a further transfusion given. The child began to breathe again, but the breathing was slow, and, at times, irregular, with periods of apnoea. There were intermittent convulsive twitchings of the left side of the body. The child did not regain consciousness and died about twelve hours after the operation. No autopsy was permitted.

Death in this case was apparently due to cerebral ischæmia following occlusion of the internal carotid artery.

CASE 5

J. H., female, aged 10 months. Two weeks before admission to hospital the left side of the neck became swollen. The swelling lasted for about three days and then subsided. Three days before admission the right side of the neck became swollen. On the morning of admission, there was a profuse hæmorrhage from the mouth and nose, which ceased spontaneously, but only after the loss of a considerable quantity of blood.

On admission the temperature was 103°. The child was pale and looked sick. There was a swelling on both sides of the neck, chiefly the right side, consisting principally of enlarged lymphatic glands, which could be palpated separately. There was a considerable amount of blood-clot in the naso-pharynx, but no opening could be seen in its wall. The right ear showed a profuse purulent discharge, from which was grown a hæmolytic streptococcus. The blood culture was sterile. The child was transfused, with a considerable improvement in the general condition. There was no further bleeding until the third day, when there was some bleeding from the nose, followed by a brisk hæmorrhage from the right ear.

The epistaxis soon stopped, but the bleeding from the ear kept recurring at intervals. Packing of the external ear had little effect, but each attack stopped spontaneously after the loss of a moderate amount of blood. A second transfusion was performed, and shortly afterwards there was a profuse hæmorrhage from the ear which finally ceased after very firm packing. The child was again transfused and then anæsthetized. Through an incision in the neck, the bifurcation of the common carotid was exposed. At this point, the bleeding from the ear commenced again. It was found that occlusion of the internal carotid stopped the hæmorrhage completely, but that occlusion of the common carotid did not. The former vessel was therefore ligated. The wound was left open for drainage as the lymph glands and other tissues of the neck were greatly inflamed.

After the operation, there was no further bleeding from the ear or pharynx, and no signs of cerebral disturbance. The temperature, which, before operation was above 104° gradually came down almost to normal. The tissues of the neck, however, were badly infected, and the operation wound presented a mass of fungating granulation tissue from which was grown a hæmolytic streptococcus. On the seventeenth day after operation there was a profuse secondary hæmorrhage from the upper end of this wound, controlled with difficulty by local pressure. The child was again anæsthetized and the common carotid ligated about an inch proximal to its bifurcation. After this second operation there was no further bleeding. The wound in the neck slowly healed, and the child was finally discharged, perfectly well.

CASE 6

M. S., female, aged 8 years. One week before admission the child developed a sore throat and a swelling on the right side of the neck. She had difficulty in swallowing solid food, but could take fluids easily. On the day before admission she began to spit up small amounts of blood, and, later, had one profuse hæmorrhage from the nose and mouth. Bleeding in small amounts continued for the rest of the day, and it was noticed that the swelling in the neck enlarged considerably.

On admission, she was not particularly pale, but looked sick. Temperature, 104°. There was a moderate swelling in the right side of the neck, which consisted partly, at any rate, of enlarged lymphatic glands. There was some fullness on the posterior pharyngeal wall on the right side, but no opening could be seen. On the day following admission, there was a profuse hæmorrhage from the mouth. On the next day the swelling within the pharynx had increased in size and had extended forward to involve the tonsil and soft palate. An incision was made into this swelling behind the tonsil. No pus was obtained, but there was an unusual amount of bleeding. On the next day, for the first time, there was some hæmorrhage from the right ear, controlled with difficulty by packing, but no bleeding from the throat. A transfusion was performed, followed by slight recurrence of the bleeding from the ear. During all this time her general condition had remained fairly good, but her temperature had been running about 102° and a hæmolytic streptococcus had been grown from her blood. The swelling on the right side of her neck had continued to enlarge, and now consisted of a diffuse brawny infiltration, beneath and in front of the sternomastoid, extending as high as the angle of the jaw. On the next day, that is, four days after admission, she was first seen by the writer. During the examination she began to bleed very profusely from both the mouth and ear. It was appreciated that the bleeding was from the internal carotid, but in spite of pressure by a finger inserted into the incision behind the tonsil and of very firm pressure on the outside of the swollen neck, the bleeding persisted and the child died in a few minutes.

Autopsy showed (Fig. 3) an erosion of the internal carotid about half an inch below the base of the skull, with infiltration of the surrounding tissues by a large collection of blood. This blood-containing cavity communicated with the pharynx by two openings, one the incision behind the tonsil, and the other, considerably larger, on the posterior pharyngeal wall

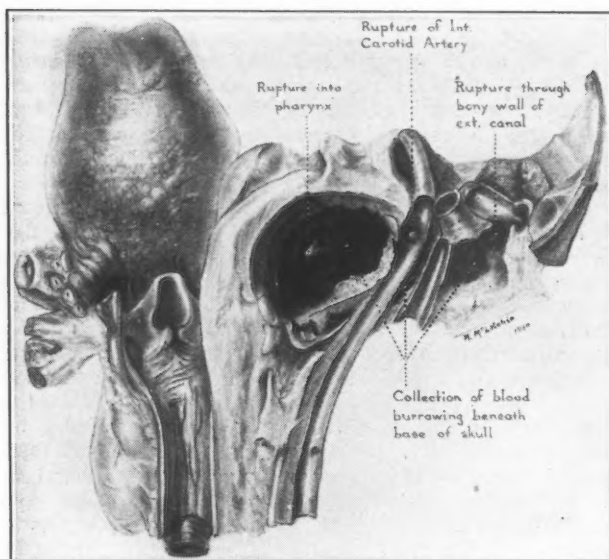


FIG. 3.—Autopsy specimen from Case 6, viewed from behind, showing the erosion of the internal carotid artery, with the burrowing of blood mesially into the pharynx and laterally into the external ear.

well above the soft palate. In addition the collection of blood had burrowed outward along the base of the skull and had ruptured through the floor of the external auditory canal just outside the drum.

The second opening, above the soft palate, was obviously the path by which the blood originally reached the pharynx, and probably explains why pressure through the other opening failed to check the hæmorrhage. It is difficult to explain why pressure over the common carotid in the neck had so little effect, unless it was that the swelling interfered with its action. It may be, however, that the bleeding continued from a collateral flow along the external carotid, or even from the distal end of the internal carotid. If this last explanation is the correct one, ligation of the internal carotid below the rupture only would not have controlled the hæmorrhage.

CASE 7

E. C., female, aged 9 years. Ten days before admission a swelling appeared on the left side of the neck. Two days before admission a retro-pharyngeal abscess was diagnosed on the left side and drained through an incision in the posterior pharyngeal wall. On the day of admission there was a very profuse hæmorrhage from the mouth. This finally ceased with local pressure, and the child was brought immediately to the hospital.

On admission she was very pale with rapid pulse and temperature 100°. There was an opening behind

the left tonsil, filled with blood-clot, but with no active bleeding at the time. A swab from this wound grew a hæmolytic streptococcus. Under a general anæsthetic, the common carotid was exposed and tied above the omohyoid, the wound closed and the patient transfused.

After the operation there was a slight weakness of the opposite arm and side of the face, clearing up completely in a few hours. There was no further bleeding at the time. Later the wound in the neck broke open, discharged pus for a few days, and then healed. The wound in the pharynx did not do so well, and after a few days a mass of fungating granulation tissue protruded from it. About a week after the ligation of the carotid, there were a number of slight hæmorrhages from this pharyngeal wound, lasting for about a week. Three days later there was a very profuse hæmorrhage which resulted fatally in a few minutes. No autopsy was permitted.

This final hæmorrhage was probably from the internal carotid artery in which the circulation had been re-established by the back flow from the external carotid. It appeared to be a true secondary hæmorrhage, either from further ulceration of the vessel wall or from softening of the occluding thrombus. It was felt that it might not have occurred had the internal carotid been tied in addition.

CASE 8

R. B., male, aged 14 months. The patient developed a broncho-pneumonia and a double otitis media. About three weeks after the onset, when the temperature had been normal for three days, a swelling appeared on the left side of the neck, and the temperature again rose to 103°. Three days later a swelling appeared on the left lateral wall of the pharynx and the respirations became difficult. After a further two days, the temperature had risen to 106°, the child was very sick and the swelling in the pharynx had increased considerably in size. Without anæsthetic, the swelling was opened by inserting a pair of sharp pointed scissors to a depth of not more than a quarter of an inch and separating the blades. There was a gush of bright red blood from the opening, and the bleeding was controlled by local pressure, only with the greatest difficulty and only after the loss of a considerable amount of blood. The swelling in the neck was said to diminish perceptibly in size following the bleeding.

Two hours after the hæmorrhage the child was anæsthetized, and ligatures placed around both the common carotid and the internal carotid just above the bifurcation. The wound was left partly open for drainage and the child transfused. After the operation there were at no time any signs of cerebral damage or any further bleeding. The temperature remained high, the swelling of the tissues of the neck increased somewhat, and the child died on the third day. Unfortunately, no blood-culture was taken, and no autopsy was permitted.

In this case the internal carotid had apparently been eroded before the incision of the abscess, and this incision merely hastened the escape of blood to the surface. Death was evidently due to infection, which in all probability was generalized.

AGE INCIDENCE

Although cases have been reported in adults, the condition is almost invariably one affecting children, usually in late infancy. Five of our patients were between one and two years of age, and the others, two, eight and nine years respectively. This corresponds pretty closely to the age incidence of acute retro-pharyngeal abscess, which becomes less common after the age of two, when the retro-pharyngeal lymph nodes begin to atrophy.

CLINICAL COURSE

The start of the illness was practically always the same, with fever and swelling on one side of the neck. In only four of the cases was there any difficulty in swallowing or breathing, and in only three had a previous diagnosis been made of retro-pharyngeal abscess. After several days, during which the child was not particularly sick, there was a rather rapid increase in the swelling in the neck, with a high fever and considerable prostration, and, after a further period of a day or two, a sudden profuse hæmorrhage. In 5 of the cases this was from the mouth alone; in 1 case from the ear alone; and in 2 cases from the mouth first, and later from the ear. In 7 cases the hæmorrhage started spontaneously and in the eighth case occurred on incision of a swelling of the pharyngeal wall. In every case, after the loss of a considerable amount of blood, this first hæmorrhage ceased spontaneously. There seems to be no reason why this first loss of blood should not prove fatal, but the fact remains that, just as in true secondary hæmorrhage elsewhere, it seldom or never does. It is equally true that its cessation is only temporary, and, after a period lasting from a few hours to a couple of days, during which there was either no bleeding, or only a slight oozing, there was a second profuse hæmorrhage, and these profuse hæmorrhages kept recurring at intervals until either the bleeding vessel was tied or the patient died. The earliest death observed occurred after the second hæmorrhage, twelve hours after the onset.

PATHOLOGY

In the majority of cases the condition appears to start as an ordinary retro-pharyngeal abscess. Following an infection of the nasopharynx, the retro-pharyngeal glands on one side become inflamed, and later suppurate. In

a few of the cases, the process appeared to start laterally to the pharynx, and the greatest swelling observed from within was of the lateral rather than of the posterior pharyngeal wall. In either case, there is an extensive infiltration of the tissues of the neck, resulting in a brawny swelling beneath the sterno-mastoid, extending to above the angle of the jaw. In the five cases in which a culture was taken, a hæmolytic streptococcus was grown in all.

The spread of the suppurative process is in a lateral direction, in front of the prevertebral layer of cervical fascia, into the pharyngo-maxillary fossa, in which lie the internal carotid artery and the internal jugular vein. The artery is the nearer of the two, and, as far as we can tell from such a small number of cases, is the vessel invariably attacked. It is possible, of course, that bleeding might take place from the jugular vein, but as a rule, in septic involvement of a vein, thrombosis precedes ulceration of the wall. It is unlikely too, that bleeding from a vein would ever be so profuse or persistent as to be confused with arterial hæmorrhage.

The wall of the artery becomes swollen and softened, and microscopic sections of the three autopsy specimens obtained show a profuse leucocytic infiltration of its coats, most marked in the adventitia and decreasing towards the intima. When rupture finally takes place, it is usually high up, within half an inch of the base of the skull. The opening is almost as large as the cross-section of the vessel. In one case it was round and smooth, and in the other two, long and jagged, its long axis being in the long axis of the vessel.

The artery ruptures usually before the abscess is opened, and blood escapes into the abscess cavity, converting it into what amounts to a false aneurysm. As none of the patients were seen before external bleeding had occurred, we are unable to say whether or not expansile pulsation is present at this stage, but we were unable to detect it in any after the appearance of bleeding. The rupture of the vessel is coincident with an increase in the swelling of the neck, and appears to precede a change for the worse in the general condition of the patient. In the three cases in which the blood was cultured, the hæmolytic streptococcus was grown in all, and it may be that a general infection of the blood

stream occurs by way of the free communication between the abscess cavity and the interior of the vessel. At any rate, most of the patients are extremely sick at this stage, and one died, evidently as the result of infection, three days after the bleeding had been successfully controlled by ligature.

If the aneurysm remains stationary in size for any length of time, a definite sac may be formed by the deposit of fibrin in its wall, as shown in one specimen (Fig. 2). The more usual course, however, is for the collection of blood to burrow rapidly, and for a hæmorrhage, either from the ear or pharynx, to occur within a day or two. The path into the pharynx is easily understood. The opening through the mucous membrane is well to the side of the mid-line, behind the tonsil, and sometimes a little above it. The path through the ear, however, is more difficult to follow. The blood burrows beneath the petrous portion of the temporal bone, and finally bursts through it at a point where it is extremely thin. In one of the autopsy specimens showing this, the rupture was through the anterior wall of the middle ear, and in the other one into the external canal just outside the drum (Fig. 3). In a third case, which recovered, blood could be seen escaping through a rupture in the drum and it was presumed that the bone had been perforated into the middle ear.

DIAGNOSIS

The chief difficulty in diagnosis is to determine the source of the bleeding. Sudden profuse hæmorrhage from the ear, so persistent that it is not controlled by packing, cannot very well be anything else but the result of rupture of a large artery, and if it is associated with fever, swelling of the neck, and fullness behind the pharynx, is, in our experience, invariably from the internal carotid in the extracranial part of its course. Bleeding from the mouth, however, may be from several sources, but these internal carotid cases are fairly characteristic. The blood is not coughed up or vomited. The child just opens its mouth and pours out blood, fairly bright red in colour, but with no obvious spurting. There is, of course, usually some choking and gagging at the time and there may later be vomiting of blood that has been swallowed. The difficulty, however, is usually increased by the fact that the patient is not seen

until the interval between hæmorrhages. Under these circumstances one must rely for a diagnosis on the history of the bleeding and the finding on examination of a fullness of the pharyngeal wall and an opening behind the tonsil.

TREATMENT

In considering treatment, we must not be misled by the cessation of the hæmorrhage. This cessation is only temporary, and the bleeding will recur, and, if left untreated, keep recurring until it proves fatal. We have no means of knowing when the next hæmorrhage will be, or which attack will prove fatal, and the case should therefore be considered one of emergency as soon as the diagnosis is made.

The actual bleeding point is usually about half an inch below the base of the skull. This makes the application of a ligature above the opening out of the question in most cases. We therefore expose and tie the carotid through an incision in the neck, and this proximal ligation alone appears to be sufficient to control the hæmorrhage, as in none of the cases in which it was done was there any persistence of bleeding from the distal portion of the vessel.

As ligation of either the internal or common carotid artery will probably check the hæmorrhage, there is some question as to which is the better vessel to tie. The answer seems to us to depend on the relative effectiveness of the two procedures in controlling the hæmorrhage and on their relative freedom from the two dangerous complications of carotid ligation, namely, cerebral damage and secondary hæmorrhage. One would expect that a ligature placed about the internal carotid, with no branches between it and the bleeding point to form a collateral circulation, would control the bleeding better than one about the common carotid, and we believe this to be the case. We were able to illustrate this point very well in one of our patients. At the stage in the operation when the bifurcation was exposed, the child began to bleed briskly from the ear. Ligatures were passed about each of the common and the internal arteries. Occlusion of the internal branch stopped the hæmorrhage completely, but occlusion of the common trunk, while it lessened the bleeding considerably, still permitted slight oozing, probably from a back flow along the external carotid. From the point of view of

effectiveness in controlling the hæmorrhage, then, the internal carotid would seem to be the one to tie.

Cerebral damage is of course the complication most to be feared after the application of the ligature. Its symptoms vary from a slight twitching or transient weakness of the muscles of the opposite side, to complete coma followed shortly by death. In the single case of ours in which the common carotid was tied, there was a slight weakness of the face and arm, recovering completely in a few hours. Of the four cases in which the internal carotid was tied, one went into a deep coma immediately and died in a few hours, and one other developed a complete hemiplegia, and a year later still had some spasticity of the leg, although the rest of the body had recovered and the mentality appeared normal. We feel that this high incidence of cerebral complications in our series is more an unfortunate coincidence than a true indication of the proportion of cases in which trouble may be expected. A good deal has been written about the effects of ligation of the carotid, and it is generally accepted that cerebral involvement is seen only in about 25 per cent of the cases, many of these being of the mild type. It is said too, that the condition is much less likely to occur in young patients. The symptoms are believed to be due to an anæmia of the brain caused by a congenitally defective circle of Willis, to a thrombosis spreading up the internal carotid, or to an embolus detached from the open mouth of the common carotid and swept into the internal carotid by a back flow from the external carotid. This last accident cannot, of course, happen if the internal carotid is tied, and, cerebral damage is said to be definitely less frequent, for this reason, after ligation of the internal carotid than of the common. Our limited experience does not permit us to express an opinion on this point, but we feel that any measure that offers a lessened incidence of this distressing complication should be adopted, and therefore think that the internal carotid should be tied.

The tissues of the neck in these cases are practically always infected, and, under these conditions, ligation of the carotid or its branches is notoriously apt to be followed by secondary hæmorrhage. This is particularly the case when the ligature is applied to a branch too close to

its origin to allow a firm thrombus to form. As the bifurcation of the artery appears to be relatively high in children, and as the tissues of the neck are always considerably swollen, it is difficult to expose the internal carotid at all, and practically impossible to place a ligature at any great distance above its origin. Ligating the internal carotid alone, then, would appear to be almost asking for a secondary hæmorrhage, and in one case in which this vessel alone was tied, there was a severe secondary hæmorrhage seventeen days later, successfully treated by ligation of the common carotid. The best plan seems to be one suggested by V. P. Blair.¹ Blair, in discussing ligation of the branches of the external carotid close to their origin, advises, in addition, the ligation of the main external artery at a point about one inch proximal to the branch, and of all intervening branches, with the idea of getting a permanent and extensive clot in the stagnant portion of the vessel. In the case under consideration, this would mean ligation of the internal carotid where it was accessible and of the common carotid about one inch proximal to its bifurcation. The additional ligation of the common trunk adds very little to the length of the operation, as its upper part is necessarily exposed already. We have employed the procedure in only one of our cases, the most recent one. In this there were no signs of cerebral damage and no further bleeding, but unfortunately the child died on the third day after the operation, presumably from its infection. In spite of this limited experience we feel that the double ligation is the most effective method of accomplishing all three of its objects—the immediate control of the hæmorrhage, the lessening of cerebral complications, and the prevention of secondary hæmorrhage, and it is therefore the procedure that we recommend for the ordinary case. The operation, however, particularly the exposure of the internal carotid in a small child, is necessarily somewhat prolonged, and in the rare cases in which the general condition of the patient does not warrant a step of such magnitude, it is perhaps wiser to ligate the common carotid only, a procedure that can be carried out quickly, and, even in a child, under local anæsthesia. Whichever operation is done, free provision should be left for drainage.

Blood transfusion is of the greatest assistance

in the treatment of these cases, as it is in all other cases of hæmorrhage, but it should be used with discretion. A transfusion, given in the interval between hæmorrhages, is very apt, by raising the blood pressure, to start the hæmorrhage again, with perhaps fatal results. At times, of course, a transfusion is urgently required, to save the life of a patient suffering from loss of blood or to get him in shape to stand an operation, but, generally speaking, the proper time for the transfusion is after the vessel has been tied.

RESULTS

Of our eight patients, three had no operation performed, and all died after repeated attacks of hæmorrhage. One had the common carotid tied and appeared to be progressing favourably when she suddenly died from a secondary hæmorrhage from the wound within the throat, seventeen days later. In one case both the common and internal carotid arteries were tied, and this child died three days later, apparently from its infection. In three cases the internal carotid alone was tied. One of these patients died within a few hours, obviously from cerebral damage resulting from the occlusion of the vessel. The second child is now perfectly well and the third is living, but a year later still had some remains of the hemiplegia that followed the operation.

It will be seen that the condition is one of extreme gravity, with a very high mortality rate, in this series 75 per cent. The treatment recommended is carotid ligation, which in itself carries a great risk. There is, however, no alternative, as the condition, without operation is apparently invariably fatal. The risk, great as it is, is therefore one that we should take, and we feel that if the need for operation were more generally appreciated, and the ligation done at an earlier stage, this mortality rate would be considerably lowered.

CONCLUSIONS

A retro-pharyngeal abscess, by spreading, may result in profuse hæmorrhage from the pharynx or external ear.

The bleeding is practically always from the internal carotid artery, which becomes eroded at a point near the base of the skull.

The hæmorrhages are profuse, and, if untreated, keep recurring until they prove fatal.

The treatment recommended is ligation of the carotid.

Even with ligation of the vessel the mortality rate is extremely high.

In conclusion I wish to express my thanks to my colleagues on the staff of the Sick Children's Hospital for their advice and assistance, and for permission to use material from cases under their care.

REFERENCE

1. BLAIR, *Ann. Surg.*, 1921, 74: 316.

INTESTINAL OBSTRUCTION*

By A. T. BAZIN,

Montreal

WITH but twenty minutes at my command I propose to treat this large subject somewhat sketchily, confining my remarks to some of the salient features and these only in their clinical aspects. To crystallize the discussion, I will classify obstruction into *mechanical* and *dynamic*.

Mechanical will be subdivided into: (1) acute complete; (2) chronic incomplete; (3) chronic incomplete becoming complete.

Dynamic will be subdivided into: (1) spastic; (2) paralytic.

* A paper read at the sixty-second annual meeting of the Canadian Medical Association, Vancouver, June 25, 1931.

MECHANICAL OBSTRUCTION

Acute complete.—This condition is most commonly and typically seen in association with strangulation or constriction suddenly interfering with the circulation of a portion of intestine. Hence the symptoms of onset are those of peritoneal shock, viz., *central* abdominal pain, nausea or vomiting, and shock of greater or less degree. The condition demands early diagnosis and early intervention. The differential diagnosis must be made as between obstruction, an acute local inflammatory lesion in the abdomen, one of the colics, perforated peptic ulcer, acute pancreatitis, torsion of the pedicle of a normal or diseased organ, tabetic

crisis, and coronary thrombosis. In all of these the onset is sudden, the course stormy.

When the acute obstruction is due to a strangulated external hernia the diagnosis should be easy, but I have seen it missed several times by too close attention being given to the epigastric pain, and neglect to thoroughly expose and examine the patient. To attempt diagnosis by intuition or snap judgment is a mistake. Routine thorough examination is the only way to avoid disastrous pitfalls.

To engage in a detailed discussion of the differential diagnosis would be time-consuming and futile. An assessment of some of the cardinal accepted symptoms would perhaps be of value.

One of the early results of acute obstruction is a spontaneous bowel movement. This apparent paradox is easily explained and should not be misleading. A function of the intestine is by peristalsis to propel its contents along and out. Mechanical interference with this function will, in a healthy state of the bowel wall, result in increased peristaltic efforts to overcome the obstruction. But the reflex stimulation will pass not only to the bowel proximal to the point of obstruction but also to the bowel distal, and faecal evacuations will result until this distal bowel is emptied.

Vomiting is of two types. Early vomiting is due to the peritoneal injury produced by the strangulation. The vomitus consists of stomach contents. Later vomiting is a regurgitant overflow and the vomitus is first stomach content, then duodenal content, and finally the putrid or putrefactive jejunal content which is commonly called "faecal vomiting." Reversed peristalsis is rarely, if ever, present in the small intestine. By some authorities it is held to be never a factor in the production of so-called "faecal vomiting." The higher, or more proximal, the point of obstruction, the earlier the appearance of regurgitant vomiting.

Distension varies according to the site of the obstruction as also with the age of the patient. The degree of distension is necessarily dependent upon the length of intestine which is filled with fluid or gas or both. If the obstruction is high in the small intestine, the distal bowel is emptied by excessive peristaltic action, the proximal bowel by early and repeated regurgi-

tant vomiting—hence there is little or no distension.

In the typical acute obstruction of infants, so-called "primary" intussusception, the recurring attacks of colic and tenesmus with violent vomiting empty the gastro-intestinal tract in both directions and the abdomen is scaphoid. Conversely, with obstruction low in the small intestine, regurgitant vomiting is not an early symptom. Thirst is a feature as no fluid reaches the colon. Therefore the whole length of the small intestine is overfilled and distension reaches the peak. In obstruction in the colon, distension is of more moderate degree, as fluids are being absorbed by that portion of the colon proximal to the obstruction.

The *pain* of acute obstruction is also of two varieties. The pain of onset is central, or para-umbilical, is reflex, and due to the peritoneal injury at the site of strangulation. The colicky pain of increased peristalsis is diffuse and intermittent.

Tenderness is not a feature, except when the distended, strangulated loop is near the surface and can be reached by the palpating hand. Later on, when peritonitis supervenes in neglected cases the pain is constant, tenderness is marked, rigidity is present and the intermittent colicky pains cease because of the superimposition of paralytic ileus.

Fever.—The absence of fever is of little aid in differential diagnosis. Any acute abdominal condition associated with much shock at the onset will present a subnormal temperature. This is found notably in high intestinal obstruction, in acute pancreatitis, in severe colic, in torsion, etc. But I would like to emphasize that the subnormal temperature is the sign of shock and not of the lesion producing the shock. In the absence of shock, a normal or subnormal temperature is helpful in excluding lesions of an infective inflammatory nature. But no dependence should be placed on mouth temperature.

Leucocytosis.—Too often we look upon leucocytosis and fever as parallel reactions to a local or general infection. This is not necessarily the case, as is proved by many exceptions to that fallacious rule. In intestinal obstruction fever is a slow development, but leucocytosis is present early. In all probability it is evidence of a defence reaction to a beginning toxæmia.

Collapse.—We will admit that early collapse is due to peritoneal shock. But later collapse is due to a combination of dehydration, toxæmia and depletion of chlorides.

Treatment.—The indications for treatment are self-evident.

The mechanical cause of the obstruction must be removed by mechanical measures. If a "closed loop" be present, as in strangulation or volvulus, this must be released or opened; a drainage or short circuit of the proximal gut is not sufficient.

Dehydration must be combated by the administration of water, and by some method ensuring absorption. The stomach is not functioning, the rectum we hope to be active in expelling the intestinal content. There remain the subcutaneous and intravenous routes. Of these two the intravenous is preferable, as I will prove later. But if the equipment for safe intravenous administration is not available, large quantities of water will be rapidly absorbed if delivered subcutaneously into a large and lax areolar space. In women with large well developed breasts the submammary areolar space has long been a favourite site. But in both sexes and in all ages there is available an even larger areolar space, the axilla. A fine needle plunged through the pectoralis major muscle close to the anterior axillary margin enters the axillary space and without danger of wounding any important structure.

Restoration of the water balance will not only improve the tone of the circulation and raise blood pressure but will dilute the toxins circulating in the blood and permit the kidneys to speed up their elimination.

But restoration of water balance is not sufficient. The patient must also be nourished and the chloride depletion must be corrected. The patient has actually starved since the onset of the attack. He has been utilizing and oxidizing his own tissues, and the substance which is first utilized and depleted is the stored sugar. Hence, the addition of glucose to the water is indicated. Now the physical laws of osmosis govern absorption from the tissues, and hypertonic solutions administered subcutaneously will not be absorbed as rapidly as will isotonic solutions. But in conditions of dehydration the viscosity of the blood and lymph is increased. Hence hypertonic solutions *will* be absorbed

rapidly until the specific gravity of the blood is restored to normal or nearly normal. Hypertonic glucose solutions will not materially injure the tissues. But the same cannot be said of hypertonic chloride solutions which are cauterant and produce necrosis. You will therefore agree that the intravenous route is preferable to the subcutaneous. Moreover it is more rapid, less painful, and it "delivers the goods."

Depletion of the blood chlorides is brought about by the arrest of normal absorption of the chlorides from the intestinal tract. Chlorides enter largely into all of our foodstuffs. Moreover the hydrochloric acid secreted by the stomach is reabsorbed from the lower intestinal tract.

The chlorides, when absorbed, combine with the sodium carbonate and bicarbonate in the blood with the production of sodium chloride, which is eliminated by the kidneys, and CO_2 , which is eliminated by the lungs. Hence the preservation of the normal alkaline reserve. But in the absence of chloride absorption the sodium carbonate and bicarbonate are in relative excess, *i.e.*, there is alkalosis. Therefore the indication is to administer sodium chloride in solution and in sufficient quantity to restore the chloride content of the blood to normal.

Inasmuch as only water can combat the dehydration it is quite unnecessary to give concentrated solutions of sodium chloride. One thousand c.c. of 2 per cent sodium chloride solution will furnish just as much salt as 500 c.c. of 4 per cent, with much less discomfort to the patient and much less insult to the blood cells. Depletion of chlorides and alkalosis are associated rather than interdependent conditions. In point of fact the condition of starvation acidosis may be produced by prolonged vomiting. But empiric experience teaches that restoration of the chloride balance overcomes alkalosis and exhibition of glucose corrects the acidosis of starvation.

Chronic incomplete obstruction.—We have here a lesion partially obstructing the intestine over a long period of time. The onset is gradual and insidious. The muscular layer of the proximal bowel hypertrophies to overcome the increased and increasing resistance. Peristalsis is therefore more forceful than in the normal bowel, hence the colicky pain which is so constant a feature. But the constriction is

progressively getting tighter, hence the increasing difficulty in getting the bowels to move and the resort to larger and larger doses of laxative medicine. Alternating constipation and diarrhoea are common conditions, the paradoxical diarrhoea of constipation.

The symptoms and signs are both general and local. There may be loss of appetite, dyspeptic distress, coated tongue, muddy complexion, loss of weight and energy, in fact the syndrome of auto-intoxication from intestinal stasis, although some would deny that this is an etiological factor.

The most interesting signs are visible and palpable peristalsis. *Visible peristalsis is not pathognomonic of obstruction.* It is seen most commonly in wasted babies with diarrhoea. An essential condition is a thin flaccid abdominal wall. It is however, frequently met with in chronic intestinal obstruction, and is of diagnostic value not only as to the presence of obstruction but as to the site of the obstruction.

We recognize three types: (a) the vermicular—which indicates multiple points of obstruction in a limited length of small intestine, such as is found in the cicatricial contraction of a mass of healed tuberculous glands of the mesentery; (b) the ladder type, which indicates obstruction of the small intestine fairly low down; (c) the colonic type, which varies according to the site of the colonic lesion. The most striking example of this type is in obstruction at the recto-sigmoid.

Inspection of the abdomen will reveal a peristaltic wave commencing in the caecum, travelling up the ascending colon, lost as the hepatic flexure recedes from the anterior abdominal wall, reappearing in the transverse colon, again lost as the colon dips beneath the left costal margin to the splenic flexure and the posteriorly placed descending colon. It finally reappears in the distended anteriorly placed sigmoid loop.

Palpable peristalsis is pathognomonic of chronic obstruction. But it is necessary to define the term; it is not the palpation of an agitated movement of the intestine, but the slow alternate flaccidity and hardening of a hollow viscus. A normal bowel cannot contract with sufficient force to simulate a solid mass. But the hypertrophied muscle of the bowel proximal to a chronic obstruction can contract with such power as to give that impression to the palpat-

ing hand. Hence the axiom, "Palpable peristalsis is pathognomonic of chronic obstruction."

In the later stages of the disease, when the abdominal wall is tense because of distension, these signs are available only to a limited extent. X-ray examination is then of great assistance. But one rule must be insisted upon. Never give a barium meal until assured that the obstructing lesion is not situated in the colon. The procedure should be, first a barium enema and then, if further information is required, *and the colon is free*, a barium meal. If the obstruction be in the colon, the water content will be absorbed from the barium meal, as it "puddles" proximal to the obstruction, and complete obstruction will be precipitated as an emergency. But in many cases barium is not necessary. A flat plate of the abdomen, with the patient lying prone, or standing, will reveal gas shadows and fluid levels which permit of the diagnosis of obstruction and localization of the site.

Treatment.—The treatment of chronic incomplete obstruction is operative, in one or more stages. It is unwise to attempt resection and anastomosis in the presence of a sodden, oedematous bowel wall.

Chronic incomplete becoming complete.—Here again there are two distinct types which we will designate *active* and *passive*.

Visualize the most common cause of chronic incomplete obstruction, scirrhus carcinoma of the colon. The muscle layer of the proximal bowel is much hypertrophied and capable of the strongest contractions. Suddenly, the constricted lumen of the carcinoma becomes blocked, it may be by some indigestible cellulose such as the skin of apple or tomato or a mass of coarse celery fibre, or more commonly by acute inflammatory oedema from infection from the ulcerated surface of the carcinoma. Violent peristalsis supervenes, with much colic and pain, great increase in secretion from the mucous membrane of the proximal bowel, with rapidly developing distension and the early appearance of regurgitant vomiting. This is the active type.

The passive type presents an entirely different picture. The same cause of chronic incomplete obstruction exists, *viz.*, scirrhus carcinoma of the recto-sigmoid. The muscle layer of the proximal bowel hypertrophies to meet the increasing resistance of the contract-

ing lumen. But there comes a time when the hypertrophy fails to compensate for the resistance. The bowel dilates, the muscle fails to contract, except feebly, and not with sufficient force to overcome the resistance. The condition is exactly parallel to the dilatation of a hypertrophied heart; there is "decompensation." There is no colicky pain, because there is no forceful peristalsis. There is increasing distension, but regurgitant vomiting is absent or very late in appearing. The patient becomes more and more toxic, as evidenced by a failing heart. Time forbids us to linger on the details of diagnosis and treatment.

DYNAMIC OBSTRUCTION

Spastic obstruction is commonly met with after operative interference in the abdominal cavity. The more manipulation, as in exploratory procedures, the more the likelihood of post-operative spastic obstruction. It is an irritable condition of the neuro-muscular mechanism of peristalsis. A smooth coordinated muscular contraction is replaced by irregular, incoordinated, spastic contractions, resulting in segmental distensions, colicky pain, severe epigastric distress, and a facial expression of great anxiety.

Treatment.—The treatment should be soothing. Sedatives, of which morphia and atropine are good examples, should be administered. Stimulating purgatives, of whatever kind, and enemata are contraindicated. The condition is a self-correcting one, given time, and is recovered from in spite of zealous treatment, but at the expense of increased discomfort on the part of the patient.

Paralytic obstruction is the most serious of all types of obstruction. It is usually secondary to some inflammatory lesion of the abdominal cavity or to acute lesions of the spinal cord. It is frequently superimposed upon one or other type of mechanical intestinal obstruction. It is due to more or less complete loss of innervation impulses to the muscle of the intestinal tract, or to a condition of the muscle which renders it incapable of response to the impulse received. An appreciation of these factors indicates the several lines of treatment to be followed.

The condition is characterized by:— (1) absence of bowel evacuations, or the evacuations are so imperfect as in no way to reduce disten-

sion; (2) increasing distension—with increasing respiratory and cardiac distress; (3) absence of all evidence of active peristalsis—no colic; whatever pain there may be is due to distension, not so much of the intestine itself as of the mobile boundaries of the abdominal cavity, *viz.*, the anterior and superior abdominal walls; (4) the presence of regurgitant or overflow vomiting; (5) an increasing toxæmia.

Enlarging upon the etiological factors mentioned above, *viz.*, (1) the loss of innervation, and (2) the inability of the muscle to respond, we must consider other factors which indicate treatment. These are (3) dehydration, or loss of water balance; (4) toxæmia from absorption of toxic proteose from the putrefactive content of the intestine or mucosa; (5) loss of blood chlorides. Let us then briefly consider these five factors in relation to treatment.

Loss of innervation is met by the administration of drugs which stimulate peristalsis, such as infundin intramuscularly, eserine hypodermically, etc. Because of the vomiting all such drugs must be exhibited by parenteral routes. Classed with these, because of its marked effect upon peristalsis, is hypertonic salt solution intravenously.

Spinal block, through lumbar puncture, is another method of re-establishing peristalsis by inhibiting sympathetic spastic control.

Aiding and abetting these agents, enemata are of value. The varieties of formulæ are legion. My own experience has taught me the efficacy of milk and molasses in equal parts.

It is to be noted that all of these measures are stimulating. But what if the muscle is unable to respond to these stimuli. A muscle whose circulation is cut off is unable to respond, for instance, a limb to which a tourniquet has been applied for some minutes. The distension of the gut and tension within its lumen effectively interfere with the circulation through its walls. Hence in advanced cases of obstruction it is necessary to mechanically reduce the distension to permit of resumption of circulation before one can hope for restoration of peristaltic movements. Vomiting helps; the stomach tube, the duodenal tube, withholding of all fluid by mouth, even small amounts evacuated per rectum with the aid of enemata—all of these help. But no one, nor all, may be sufficient. And here resort must be had to jejunostomy. It is a

mistake to postpone this procedure until the patient is moribund from a saturation toxæmia. Dehydration is due not only to the vomiting but to the inability to absorb fluids from the gastro-intestinal tract. The indications are plain. Water balance must be restored by the administration of fluids per rectum, subcutaneously, or intravenously. This results in reduction of the toxæmia, rendering it less destructive to the body tissues, increases the elimination of toxins, maintains the circulation, and adds greatly to the comfort of the patient. But water alone is insufficient. Glucose solutions will supply not only the necessary water but the stimulating and nourishing sugar, the oxidation and assimilation of which will to that extent save the patient from consuming his own tissues.

The specific toxic proteose elaborated in the obstructed intestine is absorbed into the blood stream and in circulating destroys the tissues with which it comes in contact. This is evidenced by a rise in blood urea nitrogen to 40-60-100, or more milligrams per 100 c.c. of blood. Experience has taught us in the Montreal General Hospital that a concentration over 50 mg. per 100 c.c., is of serious prognosis, even although the obstruction may be completely relieved. This is because a vicious circle is estab-

lished, the circulating proteose in such concentration destroying the body tissues and thus maintaining or increasing the saturation. This high blood urea is not a true uræmia as met with in nephritics—at least it is not so in the earlier stages of obstruction. It is not associated with a parallel rise in creatinin, as indicating renal deficiency. But the circulation of a concentration of this toxic substance through the kidneys will soon result in a toxic nephritis as evidenced by albumin and casts in the urine, showing kidney damage, and a rise in blood creatinine pointing to deficient kidney function. The indications for treatment are—empty the bowel to prevent further absorption—increase the fluid intake to dilute the circulating toxin and to promote elimination.

The depletion of blood chlorides I have already briefly dealt with. It suffices to say now that depletion of blood chlorides may be assumed in every case of obstruction with excessive or prolonged vomiting, and the indication is for intravenous administration of hypertonic salt solution. Quantitative analysis of blood chlorides is not essential. An excess of chlorides need not be feared as elimination through the kidneys is rapid.

SURGICAL TREATMENT OF HARE LIP AND CLEFT PALATE IN CHILDREN*

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LEMONIER'S name was connected with this type of deformity in 1776; later Warren, of Boston, in 1820, then Sir William Ferguson, Van Langenbeck, Veau, of Paris, Thompson, of Galveston, and many others have contributed to our present store of information on the treatment of this disease. Dr. Truman Brophy, of Chicago, particularly influenced American views and treatment, and Dr. Blair, of St. Louis, has more recently contributed to the information on this subject.

The etiology is of a hereditary nature, and we believe that all cases can be traced to some

familial tendency and not to syphilis, and that parents should be advised of this, as in one sense it will give them comfort. We know, further, that there is a great tendency for families to forget these deformities, and if this type of deformity occurs in the second or third generation, very little information will have been passed on.

The general management of the case is largely as follows. If the child has a protruding pre-maxillary bone, operation before the third month is imperative. Hare-lip deformity should be treated early or before the third month, and cleft palate not earlier than the 18th month. The child should be under ob-

* Read before the Ontario Medical Association, May 28, 1931, at Niagara Falls.

servation for two or three days before operation and a very definite history obtained of non-exposure to measles, diphtheria, colds, etc., for at least three weeks before admission. Further, the child should be gaining steadily, as these operations should be delayed in the case of the under-nourished child. Feeding is always a problem and we believe that the instruction which is being given by Mothercraft will be very helpful, as they are teaching manual expression of the breast. The mother's milk, of course, is in most cases the best food. If the milk can be obtained by manual expression or by a breast pump, and fed to the child with an eyedropper or a spoon, it is most desirable. Closest cooperation with the family doctor or with the pædiatrist is necessary in these cases, and the doctor will be in a position to know whether the child or any members of the family have been exposed to any infectious diseases.

In treating the double hare-lip deformity, with the protruding pre-maxilla, the so-called Brophy wiring is of great value, but it is unwise to blindly follow any one type of treatment, as operators throughout the United States and Europe treat this protruding bone by firm backward pressure and suturing it into position with kangaroo tendon or catgut, or, in some cases, with a single silver wire. We feel, however, that the Brophy method of wiring through the upper jaw and carrying the wires well forward to hold the pre-maxillary bone in its new position is of value in some cases, but it should be used with considerable care, as in some cases these wires seem to have a tendency to retard the development of the upper jaw. Some operators have gone so far recently as to do the lip over the pre-maxilla in its protruded position and trust to muscle pressure to carry it to its normal position. We at present are using the Brophy method for these cases, where the pre-maxilla is in a forward position, but have an open mind as to the very best method available. To avoid confusion, the balance of this paper will deal with the single hare-lip, single cleft of the alveolar arch, and cleft of the hard and soft palate, as it is our plan to give the methods we are using at present, and then to give a summary of some of the more recent work which is being done on this continent.

The child with the narrow cleft in the upper jaw between the pre-maxillary bone on one side and the distal fragment of the jaw on the other may be handled without wiring, or perhaps with kangaroo suture, or catgut, or one single wire but at no time should the protruded pre-maxillary bone be over-corrected in the alveolar arch. There are some operators who believe entirely in lip pressure, and do the lip operation before the third month and allow lip pressure to mould the upper jaw. I may say I have seen a number of these cases so treated, and feel that the result there was excellent.

The hare-lip operation may be done in the first, second or third month, or later, preferably when the child is doing well and has regained its initial loss. There are two main methods which we shall endeavour to explain. The first type of operation, we believe, was outlined by Sir William Ferguson and later by Dr. Brophy; the second type is a Mirault operation more recently modified by Dr. Blair, of St. Louis. The single hare-lip is treated by detaching from below upward a delicate strip of the vermilion or mucous membrane tissue on both sides of the cleft of the lip, but not detaching it from the lower or vermilion portion of the lip. The upper part of the lip is freely undermined on both sides of the alar cartilages, well up toward the infra-orbital region. By so doing the displaced nostril is so detached from its underlying structures that it may be brought to a more medial position, and in this way form a floor for the deformed nostril. The mucous membrane and the skin is then advanced and every attempt made to roll the upper lip outward, especially at the lower border, to overcome any suggestion of underdevelopment in the upper jaw, which exists in most of these cases. The vermilion border is taken care of finally, as little of the mucous membrane is discarded. We say that the mucous membrane should be retained, because in some operations much of it is discarded and a good lip is seldom obtained if this is done.

The Mirault operation, as modified by Dr. Blair, is perhaps a better planned operation, as callipers are used first to measure the more or less normal side of the lip and then these measurements are applied in a modified way

to the opposite side of the lip, but free undermining must be done before any measurements are made. In my experience this is an excellent operation, but rather a risky one, as all incisions are angular and must be made before any sutures are introduced and sometimes the incisions made on one side do not fit those made on the other side without shortening the lip; perhaps with greater experience we shall find it more satisfactory. A few disadvantages of the first operation described are that the lip is frequently too long and the floor of the nostril imperfect, and the tip of the nose rather low. In other words, the lips are not uniform. We believe that the modified Mirault operation will give more uniform results. This is important, as to-day people are seriously concerned about their facial appearance, and these results must be at least pleasing, to be acceptable.


The palate is best operated on after the eighteenth month and due consideration should be given to the circulation, as in the so-called Von Langenbeck operation lateral incisions are made to some length and we feel that by so doing the lateral circulation or the descending palatine arteries are in danger. Many of these palates may be united after elevating the muco-periosteal tissue from the cleft outward, without any lateral incision, but if the operator dreads any tension on his sutures there is another method of relieving this, namely by making an incision posterior to the tuberosity. Even in some cases it is suggested that the hamular process may be fractured, temporarily destroying the function of the tensor palati muscles. We are using in all these palate operations lead plates and fine wire to splint the palate and in that sense to relieve tension, but we are well aware that many operators do not feel this is necessary, and in our cases we use it to limit the movement of the palate while healing. The after-treatment for the palate cases consists in the free use of 10 per cent glucose and orange juice for two or three days after operation, before returning to the regular feedings.

I have been privileged recently to see some modifications of the recognized methods for closing a complete cleft of the palate in a

two-step operation. W. L. Logan, of Chicago, has been using this modified method when he thought it indicated, and, as he states, it is a modification of the Davies-Calley method. By this method the anterior part of the cleft is closed in the hard palate region by turning a flap about half way up on the palate inside out and tucking it under the denuded edge on the opposite side of the cleft. Then in three or four months' time the soft palate is closed. The advantages gained by this type of operation are, firstly, that the case can be finished by the eighth or ninth month; secondly, there should be better speech, as the muco-periosteal tissue has not been detached in as complete a way as heretofore.

Another operation is suggested for adult cases by George Dorrance, of Philadelphia, for improvement in speech where the closure is good but where there is a nasal voice. In a two-stage operation he raises the entire muco-periosteal tissue over the hard palate by a horseshoe-shaped incision, starting in the molar region and well up on the arch posterior to the incisor teeth, backward to the molar region on the other side, elevating this tissue and pushing the entire palate backwards, thereby producing an opening posterior to the incisor teeth, but thus gaining a longer palate. This anterior opening may be closed by an obturator or with a tube pedicle graft. To date Dr. Dorrance has operated on a number of these patients, and I have been privileged to see some and hear them speak, and the voices were excellent.

We should like to give some figures to show our results, knowing full well that, to date, as Billroth states, no perfect repair of cleft lip or palate has been accomplished. Our mortality rate in 125 operations is nil. We have not found it necessary to transfuse any cases for hæmorrhage, and the percentage of primary unions is nearly 100, if you do not consider the small hole occasionally seen at the junction of the hard and soft palate. We have had only one failure in primary union, which was remedied by a subsequent operation. We mention these results to show that in well selected operations a fair measure of success is to be expected.



TRAUMATIC DISABILITY OF THE SHOULDER*

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SHOULDER function may be seriously disabled by the common traumas of accident or occupational over-use. That such conditions deserve careful consideration is seen in the records of insurance companies and workmen's compensation boards, where shoulder injuries are found to account for an average period of disability greater than other traumas. In one large group of cases of shoulder disability not due to fracture, one-eighth recovered fully within three months, while nearly one-half had partial permanent disability, and another eighth had permanent incapacity. The contribution of x-ray examination was to the effect that one-half had no evident bone lesions, and that where such did exist they were found more frequently in the acromio-clavicular joint than elsewhere. When osteo-arthritis occurs in the shoulder following injury it is prone to become progressive, more so than in any other joint. If our previous concepts of management are insufficient, then we must face a situation that warrants our best efforts to arrive at a better rationale in treatment.

The anatomy of the shoulder joint makes for a complicated picture in which a specific diagnosis is difficult and where the relations of the several parts make extension of inflammatory process a possibility. Since the purpose of the joint is mainly motion over a wide range, its arrangements are a shallow socket and a large humeral head, held in position more by muscular force than by the capsule. The muscle tendons are incorporated into the capsule. The lining synovial membrane herniates at several points through the capsule and may communicate with the various bursæ which protect the pulley action of the muscles overlying the point of the shoulder. The function of the muscles effecting these several motions is not to be understood as being specifically limited to one or more muscles;

like a tug of war team, they may at one moment pull and the next hold. The same muscle may be said to vary between a concentric resistance and an excentric activation and it passes from one stage to the other with incredible swiftness.

The pathology, in general, of shoulder joints showing restricted movement and decreased strength deals with the several structures in their order, from skin to bone, *i.e.*, with the cutaneous, muscular, nervous, tendinous, cartilaginous and osseous components of the shoulder girdle. We shall consider in this paper the immediate and subsequent effects of trauma, as the irritant responsible for the inflammatory reaction.

In general, the subjective symptom is that of pain and the anatomical equation is muscle spasm. Pain on joint movement is a sensory nerve response, in just the same way as is the viscero-sensory-muscular reflex of the abdominal wall, and the shoulder joint, like all other joints, may be likened to the body cavity in connection with pathological phenomena. Spasm, if continued, means muscle atrophy and more pain when function is attempted at a physiological disadvantage by any of the acting muscles. Trauma produces exudate and its presence is followed by organization into adhesions. These, as we shall see, have a selective site which will further inhibit shoulder action.

Examination of a shoulder joint showing disability should follow an orderly procedure, using the unaffected joint as a standard of comparison. The relations of bony landmarks and general outline and contour are observed, the extent and range of motion is determined and any alteration in the smoothness of motion is sought out. The whole procedure aims to determine:— (1) any anatomical points of tenderness; (2) the posture causing pain; (3) the position giving relief. The cardinal diagnostic features evidencing disability are, spasm, altered contour, atrophy and paresis.

Shoulder disabilities would appear to fall

* The writer has endeavoured to review the conception of shoulder-joint disease in its clinical presentation as expressed in the English literature of recent writings.

within certain groups.— (1) Frank trauma, with subsequent restriction of function; (a) burns causing a skin cicatrix; (b) fractures and dislocations. (2) Unseen traumas, with latent disability; (1) tendinitis; (2) neuritis; (3) cartilage injury, including recurrent dislocation; (4) adhesions; (5) periarthritides-arthritis.

Evident bone injury most frequently involves the upper fourth of the humerus, *i.e.*, the the surgical and anatomical neck, the tuberosities, and, especially, the facet of the supraspinatus on the greater tuberosity. We recognize forthwith that such bony injuries in proximity to the joint will certainly lead to restriction of function, but we need to remember also that there is a degree of limitation of motion, either volitional restriction on the part of the patient, or else imposed on him by the fixation apparatus in any fracture from the wrist to the clavicle. Without going into the details of these fractures, distal from the joint, we should avoid such fixative appliances as will keep the arm applied to the body in the adducted internal rotation position. Further, the shoulder should not be neglected in the treatment of fractures of the clavicle, the lower humerus, the elbow or the forearm. The Jones humerus abduction splint does not constitute a drag on the capsule and will permit the shoulder joint to be moved once daily in all directions. In these distal fractures daily massage of the shoulder will keep it fit. "Guard well future function in the shoulder girdle even while the war wages round the elbow".

Bone injuries close to the joint involve most often the upper fourth of the humerus, and less often the neck and glenoid surface of the scapulæ. These will be considered as they directly affect the function of the attached shoulder muscles, while the effects of adhesions, etc., common in these and less apparent lesions, will come in for later consideration.

Fractures of the upper fourth of the humerus are described as being of the anatomical, and of the surgical neck. The anatomical neck is the epiphyseal line and its traumas are those of childhood. The treatment is manipulative reduction and a short period of immobilization over an axillary pad, and, in this way, there is no great difficulty in the restoration of function. The older the patient; the greater likelihood that the

fracture will be high and impacted. In the aged reduction of impaction is not to be considered and retention for three weeks will suffice. This will get a good enough functional result to serve them, even though the head is considerably rotated. In the younger group, still active in life, we have a greater need to consider function, and end-to-end approximation of the bony fragments is the prime consideration. The lines of fracture through one or other neck can be considered, academically, as constituting different varieties of fractures, but the principles of treatment are the same. Two considerations are to be noted: (1) the necessity for bringing the long lever of the humeral shaft into alignment with the short lever of the head fragment means abduction of the distal fragment; (2) the need for external rotation of the distal fragment to meet the position imposed on the short head fragment by the externally rotating muscles. Thus abduction should be effected up to the point when the fragment will not angulate. This can be regulated by the use of the fluoroscope or x-ray. External rotation should aim ultimately at 90 degrees. This means that the arm is in the "supreme" position. It is best secured at first in about 50° abduction by a plaster spica and in two weeks later, in the ambulatory stage, by some variety of aeroplane splint. As soon as plastic union is effected, then the abduction can be increased to effect a position of the arm which will give greater rest to the shoulder muscles.

Whenever traction is applied to the shoulder joint, the weight should be decreased more quickly than in the lower extremities. Too long-continued and too great traction may work great harm to the function of the shoulder muscles. Spasm is the guide; as long as spasm persists traction is required. Operative open reduction of high fractures ought to be a very rare consideration.

Fracture dislocation is not a frequent condition, and it, too, will seldom require operative measures, if patience and a fluoroscopic table are available to carry out the routine movements of reduction. Complete avulsion of the greater tuberosity may occur independently, but is more often a continuation of a fracture through the surgical neck; the principles of treatment do not differ from those appropriate to fractures of the neck. Only if the tuberosity

is evidently entirely separated should open fixation be considered, and this will be a rare circumstance.

Interest in the avulsion of the greater tuberosity is connected with the dislocation of the shoulder. The direction of the movement producing dislocation brings the tuberosity in wedging contact with the acromion and extreme leverage may result in tearing the tuberosity loose from the shaft. Therefore, in the case of any dislocation of the shoulder, wherever there is pain and loss of function continued into the succeeding forty-eight hours, then we should be on the lookout for this type of fracture having occurred coincidentally with dislocation.

In more minute injury to bones there are cases in which flakes of bone from one of the three facets of the greater tuberosity are avulsed by its tendon. The facet affected is most often that of the supraspinatus muscle. Too frequently the injury is passed up as a sprain, and a long period of disability follows. Unfortunately, too, its presence is not revealed by ordinary radiological procedure. A sprain or tear in the capsule, such as occurs in other joints, is in the shoulder practically impossible, since muscles hold the humeral head up to the capsule. The shoulder capsule is long and lax and pure capsule sprain does not occur. Severe sprains of the shoulder very frequently have their origin in rupture of the supraspinatus tendon. The patient is always a workman past middle age, and the history of the trauma is that of the "near dislocation" type, where he attempts to break the fall by throwing up his hands to save himself from the impact. Other types of injury are blows on the shoulder or forcible muscle contracture in the position of abduction. The history may show that there was a delay in the time of accident and disability, or that the man heard his shoulder "snap," and that there was increasing failure to regain normal strength. Pain is of the "floor-walking night" type. Atrophy follows in three weeks; the scapular spine becomes prominent, so that it is apparent that the supraspinatus and possibly the infraspinatus are atrophying. The deltoid soon shows the same degeneration. Supraspinatus function seems at its maximum, at that point which may be described at semi-abduction. Examination of the injured arm at the supra-

spinatus insertion will show in such cases certain variations in the form and function. When both arms are passively raised to the vertical position there is an extra fullness between the shoulder and the neck. This distention of a sub-acromial (sub-deltoid) bursa is more likely the secondary than the primary condition. It is a sign, not an entity. We may agree on a sub-acromial bursitis in any degree up to that of calcification, but must continue the search further for the primary factor. This is related to a tear in the capsule where the expanded tendon of the supraspinatus with the infraspinatus and teres minor fuses with the posterior and superior portion of the capsule, thus bringing the bursæ into direct communication with the joint cavity. Examination of the function of the affected arm now proceeds. The arm hangs at the side, the elbow is drawn backward, thus throwing the humeral head forward; the superior surface of the tuberosity is felt antero-external to the acromion and is tender. A sulcus is felt nearer the acromion and indicates the site where the tendon, if intact, would fill out the contour of the shoulder. If the arm be either actively or passively abducted the point of tenderness disappears under the acromion, and, at the same instant, the patient winces, then the arm goes on to vertical elevation, without further pain. Beginning again with the arm at the side, with the elbow fixed and flexed to the right angle, swing it outward, and the tender spot rotates, following the course of the great tuberosity. When the arm is vertical and allowed to fall, the action is rhythmical up to a certain point of semi-abduction, *i.e.*, half way from shoulder to side. When the wince again appears, the patient "lops" over to the affected side, during the last thirty degrees of the fall of the arm to the side. The examining fingers may feel a soft crepitus at the instant the wince occurs. A further analysis shows that in the upright position passive abduction can be produced to nearly shoulder level before the painful spasm is felt. Active abduction is painful at thirty degrees, but in the stooped-over position the antero-posterior pendulum action over a wide range does not produce pain.

Rupture of the long head of the biceps has been credited with being the common cause of shoulder disability. It does occur of course, but in the common sprained shoulder flexion of the

forearm is permitted, if the upper arm is steadied, hence the biceps cannot be at fault, since this is its function. However if the arm hanging and supination of the hand causes shoulder pain then we must admit the possibility of a lesion of the biceps. This is not so common as the complex previously described, *viz.*, a lesion of the supraspinatus tendon. With the latter, either the tendon avulses a portion of the facet, causing a sprain fracture, or else, in an incomplete tear, there is damage in the structure of the tendon itself. Since it is almost without blood supply the tendon will undergo a partial necrosis which will be followed by a calcareous degeneration. Anatomically, this swollen tendon would be pressed upon when the rim of the tuberosity impinges against the acromion, and this corresponds to the clinical picture. Treatment of the hyper-acute cases is said to be operative, to remove the calcareous deposits, and in the lesser acute cases to put the arm in a comfortable position in a cast for a short time, and then follow up with the usual physiotherapy management.

Certain cases of shoulder injury have a "neuritis" aspect, as a persistent symptom. There is a painful disability, with widespread distribution of tenderness. The condition is not localized as in supraspinatus injury. The muscle affected is one of several of the shoulder girdle, the deltoid, supraspinatus, infraspinatus, teres major and minor, and the clavicular fibres of the pectoralis major. The innervation of these is by the fifth and sixth cervical roots of the brachial plexus. The history of the injury received is some form of "header", or a fall on the tip of the shoulder with the head pushed forcibly aside. The mechanics is similar to that of obstetrical paralysis, even though the picture is not a classical one of the upper arm or other type of paralysis. It is a reasonable thing to assume that if a muscle may have a few fibres stretched, avulsed or torn, the same can happen in the nerve with a resulting degree of paralysis. With regard to the suprascapular nerve its exposed position in the notch makes the peripheral trauma easily possible. The greater angularity of the higher nerve roots of the brachial plexus makes it possible that they may be traumatized near the root by a pulling force, when the head is

pushed forcibly and suddenly away from the shoulder. One should remember that injuries to other nerves besides those to the circumflex to the deltoid may occur. The examination of such cases consists in seating the patient at a table and having him sweep the forearm outward from the elbow as a centre; when one side is affected it will lag behind.

Certain injuries to the cartilage contribute to the shoulder disability. The acromioclavicular joint is exposed to injury from such downward acting forces as occur in a toss over the handle-bars of a bicycle or wheelbarrow, or when one is carrying a load on the shoulder and steps accidentally into a hole. The mechanism involved is really a pivot action about the glenoid, forcing the acromion downward and thereby swinging the clavicle medially, thus pushing up the coracoid process until it avulses from the clavicle the fibrocartilage which, with a small synovial sac, constitutes the joint. Further force will rupture the coracoid and trapezoid ligaments. The ill effect of injury to this joint lies in the circumstance that this joint is really the centre of motion when the arm is raised from the side.

Recurrent dislocation of the shoulder is a troublesome disability. The mechanism of production does not conform to that of the initial accident, and a blow on the elbow or scapular region may suffice to put the shoulder out. It is believed that this recurrence is made possible the fact that in certain initial dislocations, there is not only a splitting of the capsule but also a tearing of its marginal attachment to the fibro-cartilaginous glenoid ligament. This latter does not heal as does the envelope of the capsule proper and re-dislocation is made very easily possible.

How often it is the case of the aged, with a Colles fracture, that the persistent shoulder disability outweighs the wrist injury. The pathology would seem to be central trauma to the cartilage of the glenoid cavity, and a degree of osteo-chondritis with proliferation of granulation tissue. Bone erosion follows, if rest is not imposed and arthritis is in progress. Bone proliferation may succeed this phase in nature's effort to fix a painful joint by ankylosis.

We come now to the largest group of cases of shoulder disability, where a definite anatomical lesion is not determined, and find that synovitis,

peri-arthritis, strain or bursitis are very loosely used terms. In general we may say that there is injury to the soft parts, with coincident synovitis, that sprain of muscle or tendon is the lesion of the acute variety, and assign to the more chronic cases the designation, peri-arthritis. Bursitis is a term which has been overworked in literature and is not expected to be an unrelated clinical circumstance. Overwork of certain groups of muscles will result in strain in which exudate results, and this in turn results in adhesions about the tendinous extremity of that muscle. It is not always possible to single out the exact group of muscles affected, but when pain occurs on motion in one particular direction, this leads one to the special group, more definitely if the pain is increased by passively stretching or actively resisting such motion. The pain may be felt at the insertions of the muscle or tendon and this is especially true of the deltoid. In case of a small rupture, of the superficial muscle fibre, hæmorrhage will appear. The appearance of subcutaneous hæmorrhage along the bicipital groove is not to be ignored as to possible consequences.

The capsule of the joint is really the fusion of the expanded tendons, and, since these are avascular structures, fibrosis is the paramount sequelæ of injury of the capsule proper, and whenever the injured shoulder rests in a sling for a period then shortening of the capsule occurs in its inner aspect, and elevation and external rotation are seriously restricted.

The same process occurs within the capsule whenever exudate results. The synovial lining presents on its antero-inferior portion certain thickenings or ligaments. The lining synovial membrane is thus more infolded at this part, and whenever exudate occurs within the capsule or reaches it from the connecting bursa lying without, then the organization of this fluid means adhesions. The history of such a case is one of trauma, even a very insignificant one, followed by a period of sling treatment. Examination will show that abduction and rotation are limited and painful in the outer half of the arc of motion, and when these are forced there is muscle spasm when the pull comes on the contracted anterior capsule. Knowing this, our aim is prevention, and no factor is of greater importance than the

avoidance of the sling habit in all shoulder injury management. The exact value of forcibly breaking down the adhesions is controversial. In the very recent case that is acutely painful this should not be attempted at once but treatment lies in abduction with the application of heat and waiting for subsidence. Where spasm persists, bed management with some form of traction is essential. On the other hand, if the pain is less acute and restriction occurs in the outer half of the abduction rotation arc, then the operation of breaking down bands of adhesions should follow. Without this it is futile to spend time and money on physiotherapy, as is too often done. As a clinical guide we may say that if the patient can lie on the affected side, we can proceed to break down the adhesions. When attempted it requires several progressive attempts under full anæsthesia, protection to a recent fracture, retention for some hours in the secured position, allowance for muscular atrophy in the range of the several motions that one seeks to increase, but most of all the full exercise of these increased functions by the patient's own volitional act. "The power to increase function is the patient's own will and brain." (Hunter).

The rôle of intra-articular arthritis in painful and stiff shoulders is extremely difficult to estimate. Certain cases develop arthritis following trauma, and trauma may be either a precursory circumstance or a predisposing factor. In either case there may be a history of a relapse following the initial relief of the traumatic symptoms. The clinical examination shows that motion in all directions is painful and produces spasm that restricts movement at the extremes of range. The grating that occurs early is not always due to intra-articular loose bodies, but may be traceable to exudate beneath the deltoid which frequently disappears entirely. Arthritis and peri-arthritis may easily be coincident, with precedence in time given to the latter. If a difference can be stated, the point of tenderness in arthritis is over the joint, and in peri-arthritis about the insertion of deltoid. The clinical problem is to determine where stretching and movement will benefit, and also the relation of focal infection.

Where arthritis exists with rapid muscle atrophy then it is rational to consider the pro-

cess infective and to do a reasonable removal of suspected foci, and when the joint is quiescent and showing some increased range of motion to force motion by breaking up adhesions. If radiograms show that there is extensive lipping of the joint margins or the degeneration of osteoarthritis is present, such measures are useless and ankylosis is to be anticipated by the maintenance of the joint in the optimum position of 60 degrees abduction, 15 degrees forward extension, and 45 degrees external rotation.

In conclusion the general principles of treatment are:—

1. In serious traumas of the bone, nerve or cartilage, absolute retention is effected, and continued as long as required for initial union. Compression strapping over felt is indicated as a means of limiting exudate.

2. The position of election in the acute stage of even minor trauma, is "bed", to relieve the drag on the capsule, with the arm in the "supreme" position, a position easily secured by pillows. If this does not suffice to overcome

spasm then some form of pulley weight traction must supplement the postural management. The general principle is rest, but not too much or for too long a time.

3. In general, for all injuries, assisted active motion should be instituted early; "a move a day keeps adhesions away." This may be supplemented by various forms of legitimate physiotherapy. Encouragement is given for voluntary group muscle contraction while in splintage, *i.e.*, muscle re-education. Thus the patient is encouraged to make as though he were going to do something with the shoulder, *e.g.*, shrugging. Gentle contraction may be induced by galvanism during the retention period.

4. In older patients especially avoid the sling habit, which adducts the arm and internally rotates the shoulder, a position where adhesions form and muscular atrophy follows, thus the motions of personal requirement are lost.

5. Supportive strapping with adhesive to help the muscles to function without strain, when use is permitted.

THE TREATMENT OF RENAL DISEASE*

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THE function of the kidney is the maintenance of a normal condition of the blood and tissues in regard to their concentration of metabolites, salt and water content, hydrogen ion concentration, etc., to excrete the end-products of metabolism of the tissues, and to dispose of certain substances ingested in excess of the requirements of the individual, as well as toxic substances produced within the body. In varying degree the lungs, skin and alimentary tract may assist in the performance of this work. Disease of the kidney implies a concomitant disturbance of these functions, together with such compensations and adjustments for the physiological defect as can be called into play by the body. The treatment of renal disease consists mainly in augmenting the efforts of nature, in taking the load off the injured organ, and mak-

ing the best possible use of the compensating mechanisms. Dietetic treatment is a large and important part of this treatment, and in different phases of the disease different aspects require to be emphasized. The water intake in one case may be most important; in others greater care must be taken with the salt intake, the total calories or the amount and kind of proteins administered.

Recognition of the differences encountered in clinical cases makes a classification of renal disease helpful if not essential for the institution of suitable treatment. Most clinicians to-day are using some modification of the one proposed by Volhard and Fahr in 1914. They recognize two main types of injury, the inflammatory and the degenerative—nephritis and nephrosis—and these are again divided into acute and chronic stages. It is also possible to differentiate between focal and diffuse nephritis, but the focal

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type is of little clinical importance in itself, being merely a renal manifestation of a more serious general disease.

Simple acute nephrosis is an uncommon disease, and there are many who believe it incorrect to regard it as solely a renal disease. Though albumin and casts appear in a scanty urine of high specific gravity, no blood is present, the degeneration is confined to the tubular epithelium, and the blood pressure is normal. *Œdema* is an outstanding symptom; the basal metabolism is low; the normal excess of albumin over globulin in the serum is reversed; and cholesterol is present in large amounts in the serum and the reticulo-endothelial system. It apparently results from an intoxication of some sort. No specific treatment is known. Many patients recover completely with the most diverse treatment; often, however, they die of an intercurrent infection. An extremely high protein diet, introduced by Epstein, has been productive of good results in some hands. Urea in large doses is sometimes useful as a diuretic. Induction of acidosis by calcium chloride or ammonium salts, or the use of the purin and mercury diuretics (salyrgan) is sometimes successful in reducing the *œdema*. Parathormone has also been recommended. Whole blood transfusion has been said to be valuable. I am opposed to prolonged under-nutrition in these cases, but rest in bed and drastic restriction of mineral salts and water is essential; and free purgation is useful in reducing massive *œdema*. While the possibility of focal infection should be thoroughly investigated, the danger of surgical intervention in *œdematous* patients should be kept in mind, and operation undertaken under favourable conditions. For the same reason, tapping serous cavities, or that relic of barbarism—Southey's tubes—should be avoided whenever possible. Dried thyroid gland sometimes induces a diuresis. The amount required is large; I have used as much as fifteen grains daily without raising the basal metabolism.

A special variety of nephrosis is produced by certain poisons. In these cases the degeneration almost amounts to an acute necrosis of the tissue, varying in severity, of course, with the amount of poisonous substance coming to the kidney. Mercury is perhaps the commonest example of this class of poison. *Œdema* is not

a marked feature of this type of nephrosis, largely because of the vomiting and purging induced by the mercury. Besides the necrotizing action of the metal on other structures of the body, which may in itself cause death, the kidney injury may be so great as to cause a complete anuria and death from uræmia. Early stomach lavage with large amounts of fluid is most important. After the initial attempt to wash out the stomach with fluid and yet more fluid, containing some thiosulphate to precipitate the mercury as an insoluble salt, the patient should be given gavages and colon irrigations, with sodium thiosulphate in the solution, at frequent intervals. The early administration of 20 grains of sodium thiosulphate intravenously may possibly be of benefit. The diet may consist of fluids with soluble carbohydrates. Purgation may be resorted to if necessary. The initial gavage is usually followed by the administration of two ounces of magnesium sulphate. If uræmia threatens, and indoxyl and phenol compounds accumulate in the blood, purgation combined with the administration of powdered charcoal should be resorted to. The patient may require circulatory stimulants, mouth washes, etc.

I have said that nephrosis is a rare disease. When recovery takes place it is a complete restoration to normal, and in this respect is better than in nephritis, in which clinical cure always results in a scar. Simple acute nephrosis is most commonly confused with subchronic nephritis with marked *œdema*, but can usually be differentiated by the history, the physical signs, or the subsequent course of the disease. In my belief, many of the cases of nephrosis of the type described by Epstein really belong with the latter group and eventually pass into the stage of renal insufficiency. True chronic nephrosis is quite rare. The treatment is similar to that required in the stage of renal insufficiency of chronic nephritis.

Acute nephritis is an inflammatory lesion of the kidneys associated with a rise in blood pressure and the presence of albumin and casts and, particularly, blood in the urine. Varying degrees of nephrosis accompany the inflammatory process, and more or less *œdema* is usually present, the tendency to *œdema* being greater with greater tubular degeneration. To-day, there can be little doubt that most of these cases follow

an upper respiratory infection. The removal of foci of infection at a suitably selected time is very important for the patient's future welfare. The greater number of cases of acute nephritis should recover clinically if treated early and persistently. Though often critically ill, it is uncommon for a patient to die of acute nephritis alone. Nevertheless, neglected cases have their lives materially shortened. Rest in bed is essential. In early severe cases with high blood pressure, œdema and marked oliguria with hæmaturia, the most drastic measures seem justified by results. A complete starvation of food and fluid imposed for two or more days may result in diuresis, lowering of blood pressure, and cessation of hæmaturia. If necessary, the rigorous nature of the treatment can be somewhat mitigated by small quantities of cold sweetened fruit juices. Purgation is also employed, with hot packs in the lumbar region, and diathermy may possibly be of value. Induction of spinal anæsthesia from the sixth thoracic segment downwards, stripping the renal capsule, or section of the renal nerves, are reserved for the gravest cases.

In cases of acute nephritis of a little less severity and longer standing such marked restrictions may be of little benefit unless the œdema is massive. Nevertheless, rest for the injured organ is a prime consideration in treatment. By free purgation, considerable water and inorganic salts, some nitrogenous material, and the toxic products of bacterial action on the intestinal contents (ordinarily excreted with some difficulty by the kidney) may be removed. One recognizes that a gradual destruction of body protein and other energy yielding materials is continuously taking place and that some kidney work is inevitable even though the patient is at rest in bed. Food and fluids should be kept within the limits of the kidney efficiency. For accuracy of control and ease of administration, small quantities of milk, 500 to 800 c.c. per day, may be prescribed and later increased when it is shown that the kidney is capable of excreting the waste products. No harm, however, is done by even rather prolonged periods of under-nutrition but, in this case, vitamin C should be supplied in the form of orange or tomato juice. Foods high in carbohydrate and fat may be added to the diet as improvement takes place, the usual condiments and flavouring agents,

except salt, being used in ordinary quantities. As the sodium salts tend to produce œdema and seem particularly difficult to excrete in this stage, it is advisable to restrict salt. Because of their water-carrying properties and their inorganic salt content the bulky carbohydrate foods, such as vegetables, are also limited in amount.

One would prefer to increase the work of the kidney only as rapidly as the recovering renal tissue shows an ability to handle it without recurrence of blood or albumin or rise in blood pressure. When an adequate caloric intake is successfully borne, the patient may be allowed up. This means increasing the metabolic strain by several hundred calories per day and, more particularly, increasing the protein breakdown and the amount of nitrogen to be eliminated. Careful observation should be made at this stage for evidence of damage and then, if the condition be satisfactory, an increase in the protein to 60-75 grams per day is allowed. The last change to be made for some time to come is to allow salt in the cooking of the foods. Most acute nephritics are well advised to restrict the amount of protein somewhat and to forego salt at the table for a year after a clinical cure has been obtained.

Though most cases of acute nephritis tend to get well, in the last few years a subacute progressive variety leading to renal insufficiency in six months to two years has become more frequent. This form does not differ in its onset from the usual case of acute nephritis, but the symptoms and clinical signs subside, only to show repeated recrudescence with fresh hæmaturia and a rising blood pressure and oliguria. Rapidly these repeated, usually mild, exacerbations destroy kidney efficiency and the patient soon dies in uræmia. Treatment in the later months must approximate that of chronic nephritis, but it is important to recognize early the rapidly progressive character of the disease. Frequently these cases have a readily demonstrable focus of infection and this should be eradicated, not, as in the ordinary acute nephritis, when focus and kidney condition have become quiescent, but as soon as possible.

Among the many other aspects of the treatment of nephritis, the use of heat must be considered. All nephritics, whether ambulant or in bed, should be kept warm and guarded

carefully from chilling. In our climate an indoor occupation is best for ambulant cases. The use of the electric hot pad, hot water bottles, or even the linseed hot pack to the lumbar region has sometimes been of value in cases of oliguria. The general hot pack I cannot advocate on account of the discomfort, the risk of collapse, the enervating effect, the risk of subsequent chill, and the paucity of good results. It is not to be denied, however, that some water, some salt and some nitrogen can be eliminated in the sweat. Dry heat is much more comfortable and efficacious, though more difficult to obtain outside of hospitals.

The use of diuretics is another point of much interest. Some evidence is accumulating that certain diuretics act, in part, extrarenally. Nevertheless, they do increase the work of the kidney at a time when the maximum amount of rest is most valuable to it and should therefore be avoided. Many cases are definitely made worse by their use. In cases of marked œdema it may be useful to omit food and fluids for twenty-four hours, then to administer three pints of water, flavoured if desired, within an hour. Obstinate cases sometimes respond to such treatment with a marked diuresis and improvement in the urinary findings.

It seems best to regard all nephritis as being various stages of an inflammatory process. Even though in many cases we are unable to obtain a history of a previous acute nephritis, the physical signs and course of the disease are quite similar to those with well established origin. The phases or stages of the disease are sometimes difficult to separate. An initial attack of nephritis may be considered as acute while it continues to increase in severity, and even as long as it continues to improve. Time does not enter into the question. When a cure is obtained the patient no longer has nephritis. When he reaches a certain grade of improvement then fails to show further improvement or even shows signs of further injury, the condition may be regarded as chronic which, in this case, is synonymous with incurable. With Volhard, we divide these into two groups: those with a sufficiency of renal tissue, albeit the kidney reserve is somewhat reduced, called the second stage or *subchronic nephritis*; and the other, the stage of renal insufficiency, the third

stage or *chronic nephritis*. The second stage, or subchronic nephritis, comprises most of the ambulant nephritics, and with a gradual more or less rapid deterioration of renal efficiency fades slowly into the final or chronic stage of the disease.

The subchronic stage may last years or even decades and, indeed, under fortunate circumstances, the chronic stage may be very prolonged. Two factors tend to shorten the patient's life—exacerbations and overwork of the kidney—and it is in the subchronic stage that more care should be taken of the patient than is usually done. While there is a general impairment of the functional reserve power for excreting all substances, this reserve is most nearly used up in the case of water and salt excretion, and we find a marked tendency to œdema in this stage. Nothing has previously been said of the value of functional kidney tests in the control of treatment. In this stage, however, they should be put to the fullest use, particularly the water and concentration tests, in order that we may have an accurate idea of the remaining efficiency of the patient's kidney and prescribe treatment accordingly. Salt and water is allowed in suitable quantities and the protein intake may be restricted to 50-70 grams, approximately half the amount we ordinarily use on this continent. A daily saline is desirable. The patient should be kept warm at all times, and prompt attention to colds, minor infections, teeth and sinus affections will do much to ward off the exacerbations which accelerate the patient's progress toward the chronic stage. During an exacerbation the patient is treated as an acute nephritic, making the necessary modifications for the chronic condition.

Convulsions may be mentioned here as their occurrence is chiefly confined to acute nephritis and the acute exacerbations of subchronic nephritis. They are due to defective water balance in the brain and have nothing whatever to do with true uræmia. The first thing is to prevent the patient injuring himself by biting his tongue, etc., then stop the convulsion by administration of chloroform until morphine (gr. 1/3-1/2) has time to act. To remove the fluid from the brain, intravenous injections of 50 per cent glucose solution are used. The œdema fluid will tend to return to the brain and other tissues and convulsions recur unless it is removed from the

blood stream before the glucose is converted to glycogen. Free purgation is, therefore, induced with croton oil or liberal amounts of magnesium sulphate, and recurrence of the convulsion is unlikely provided sufficient care is taken with the administration of salt and water.

The stage of chronic nephritis with renal insufficiency follows upon the subchronic stage. The patient has already found it necessary to excrete larger quantities of urine at night in order to keep the waste products of metabolism from accumulating in the blood stream. With a rising blood pressure, the kidney is stimulated to polyuria, also a compensatory process. The urine is low in specific gravity, but increased volume output is made to compensate for reduced percentage of urea and other metabolic waste. In acute and subchronic nephritis the intake of fluid was reduced to spare the kidney; in this stage liberal fluid administration is necessary to permit the compensatory polyuria to remove waste products. At the same time, the production of nitrogenous waste must be reduced to a level within the capacity of the kidney to excrete. The caloric intake is, therefore, supplied largely by carbohydrate and fat; protein is restricted and the patient is kept at rest. While the water and concentration tests will tell when the kidney reserve is exhausted, in this stage it is necessary to depend more on blood retention tests (non-protein nitrogen, urea and creatinine) to determine the amount of protein allowable, as well as the prognosis.

When only a limited amount of protein can be metabolized with safety, it is best that it should be of first quality as far as human tissue-building power is concerned. One then feeds the patient meat, eggs, fish, milk and milk products, limiting the quantities for the individual case. The vegetable proteins are differently constituted from the flesh proteins in their content of amino-acids, some of these being present in excessive quantities, while others essential for human nutrition may be wholly lacking. When total protein must be limited, the restriction to vegetable proteins is inadvisable, since they go to increase the wastage which must be excreted by the kidney and cannot accurately replace the broken-down human protein. This is of little importance when the kidney is normal; in the late stages of kidney disease, however, when uræmia must be guarded against, it becomes an important

matter. The anæmia from which most chronic nephritics suffer is also a reason for using protein of the first quality.

True uræmia results when sufficient impairment of kidney function has taken place to cause an inability to excrete all the metabolic waste of the body. Through slight dietary excess it may come on very slowly, induce a periodic headache, anorexia, nausea, or even vomiting, and thus improve for a time. More severe dietary stresses laid on the kidney may produce more marked, possibly dangerous, evidences of the condition, such as vomiting and dehydration. This condition is controllable by readjustment of the diet, using more carbohydrates, fats, and fluids with less protein.

When an acute exacerbation produces an oliguria in patients already suffering from the subchronic or chronic forms of renal disease, uræmia may occur. At least one-half the cases of uræmia are of this type. The patient's main hope lies in the repair of the acute injury. Meantime, the protein breakdown should be kept at a minimum by rest, and by feeding an adequate carbohydrate diet with liberal fluids and a minimum of protein. If necessary, 3,000 to 4,000 c.c. of fluid containing glucose may be given intravenously daily by slow drip. In this condition, notwithstanding the acute injury, it is most unwise to restrict fluids. Purgation is accomplished by liberal dosage with magnesium sulphate. Since it appears that the products of intestinal putrefaction absorbed into the blood stream play a part in uræmia the use of powdered charcoal, 150 gr. per day by mouth, for the purpose of adsorbing these compounds as soon as formed, may be recommended.

Slow progress of the disease, causing a gradually mounting insufficiency, is productive of a third variety of uræmia for which little can be done. This variety presents the classical picture of asthenic uræmia: fatigability, morning exhaustion, weakness, mental and physical irritability, nausea, anorexia, cachexia and, later, somnolence, dyspnœa, dehydration and coma. The treatment suggested above may be tried. The alkaline salts may be used to relieve the dyspnœa; intravenously administered glucose (without salt) may relieve dehydration; and the milder sedatives, the irritability. Relief of discomfort may be obtained, but satisfactory improvement is improbable.

A CONSERVATIVE TREATMENT OF INCOMPLETE ABORTION

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CURRENT medical literature abounds in the rare and unusual in medicine, at the expense of the commonplace every-day problems with which the general practitioner must grapple. Among the commonplace problems are there two commoner conditions to be met than gonorrhœa and abortion? And yet how often do we meet them in our medical reading? The object of this paper is to bring up again the subject of abortion, chiefly from the standpoint of treatment. The treatment here described is that used in our cases admitted to the Vancouver General Hospital during the past six months (January 1 to June 30, 1931).

A good many years ago the profession became impressed with the conservative treatment of abortion as compared with the earlier and more radical methods of treatment. Much has been written about that protective zone of lymphocytes which lies in the basal structures of the endometrium and which if broken down by any form of trauma allows free access of the potentially infective areas to the maternal circulation. It is felt that if such a mental picture is kept before us probably the uterus will receive more of that respect which is rightfully its due.

A study of the records of cases in the gynæcological service of the Vancouver General Hospital from January 1 to June 30, 1931, shows that 41 cases of abortion were admitted. These were classified as follows: complete, 10; incomplete, 28; threatened, 3.

By complete abortion we mean those cases who were admitted as inevitable abortions, and who after admission succeeded in completely emptying their own uteri or for some reason had therapeutic abortions performed. All 10 cases ran an afebrile and uneventful convalescence. By incomplete abortion we mean those cases who were admitted with a history of amenorrhœa, followed by bleeding, intermittent pain, and the passage of clots or masses of some sort before admission. By

threatened abortion we mean those cases who came in showing the classical signs of impending abortion, but whose crises were averted and who were discharged as normal cases of pregnancy.

The treatment of complete and threatened abortion is carried out in this clinic on the same conservative lines as that of incomplete abortion. The detail of treatment is, however, not within the scope of this paper.

GENERAL TREATMENT

Incomplete abortion should be treated as an open wound and given the same care and consideration. Each patient with abortion admitted under the staff of the Vancouver General Hospital is put to bed, and an ice bag applied to the lower abdomen for the purpose of improving and keeping up uterine tone. If there be bleeding, we may or may not elevate the foot of the bed, but it is doubtful if posture in bed has any influence on uterine bleeding. If the bleeding is marked, pituitrin 0.5 to 1 c.c. may be given. In our series it is surprising how very seldom it was found necessary to resort to an oxytocic.

As soon as possible every patient with incomplete abortion is placed on an examining table, a vaginal speculum inserted and, with a good light the vagina and cervix inspected. This procedure is carried out under strictly aseptic conditions. It is the only procedure in our whole routine which might be considered as bordering on the radical, rather than the conservative, in treatment. One or two experiences however, have shown us that fragments of the products of gestation may lie, completely separated from the maternal wall, in the cervix, or even in the vagina. These fragments, being foreign bodies, can be readily removed with sponge forceps, but if left *in situ*, may or may not be expelled. If not, they must be absorbed and the process of absorption may lead to sepsis. We believe that a goodly number of

cases have been saved from the category of "septic abortion" by this simple procedure. No bimanual examination is made, nor any manipulation of the uterus that might in any way even remotely suggest trauma.

Having satisfied ourselves that those products of gestation remaining to make the abortion incomplete are *inside the uterus*, the following routine treatment is instituted. A complete history is taken, a catheterized specimen of urine sent to laboratory, a Wassermann test is made, a complete blood count and the blood pressure is taken. The nursing treatment consists of absolute bed-rest, an ice-bag to the lower abdomen, plenty of fluids, a well rounded supportive diet, a heavy Russian oil, ounces $\frac{1}{2}$. three times a day, to be cut down if necessary. but if not enough to be followed up with a soap-suds enema every 48 hours. Should the temperature and pulse remain within reasonable bounds, the patient is left strictly alone and permitted to empty her own uterus in her own way. This, we believe, the overwhelming majority are quite capable of doing. At least so it has been found in our series.

HÆMORRHAGE

The old adage, "An empty uterus never bleeds", might imply that a uterus only partially emptied bleeds freely. The initial fear of abortion is the fear of hæmorrhage, and it is because of this that so many active measures are taken by many men. The routine use of pituitrin, ergot, vaginal or even uterine packing, intrauterine douches, curettage, etc., are all introduced to offset the risk of immediate hæmorrhage or subsequent infection. Our experience is that hæmorrhage from incomplete abortion is by no means common. Threatened abortion of course demands our strictest watching because of the tendency towards sudden and vicious hæmorrhage, but threatened abortion is not considered in this paper.

OXYTOCICS

Oxytocics are not given as a routine. The reason is that they were not found necessary to prevent bleeding and we have found them unsatisfactory as a method of completely emptying the already partially emptied uterus.

TRAUMA

Uterine or vaginal packing was not resorted to in our service. As a routine we consider it bad practice. Too little, we feel, has been written about trauma in the presence of incomplete abortion. The whole idea in our conservative treatment is to keep infection from spreading to the cellular tissues beyond the uterine wall. And how does post-partum infection spread? By means of lymphatics and by surface continuity, as does gonorrhœa in the endometrium? No. The intrauterine infection accompanying abortion to a great extent extends directly through the walls of the uterus to the cellular tissues beyond. No doubt the added risk accompanying curettage comes far more from trauma than from the risk of carrying in infection. Trauma to uterine musculature under such conditions breaks down the protective leucocytic barrier around the infected placental site and takes from the muscle something of its power to inhibit the migration of infective bacteria or their toxins. It is felt that the trauma to the uterine wall from packing, even vaginal packing, is very real and so to be avoided. Emergency hæmorrhage is, of course, another matter, so obvious as to need no comment. Emergency, like necessity, knows no law.

The practice of many men to use the examining finger as a curette and to sweep out all particles of the gestation still attached to the uterus is doubtless satisfactory from the standpoint of immediate results. It is, however, added trauma, no matter how gently the procedure be carried out, and therefore, in our opinion, better left undone. In view of this it is hardly necessary to comment on our attitude concerning curettage in the treatment of this condition. The exigencies of staff practice may, however, be such as to make it impractical to keep intractable cases in hospital indefinitely. Such a reason for performing a curettage is theoretically weak, but, practically, may at least elicit sympathy. We curetted one case of incomplete abortion in this group of cases for the above reason.

INFECTED ABORTION

One of the barometers of the financial conditions in a community is, I think, the number of abortions admitted to that community's hos-

pital. Especially is this so with regard to the number of criminal abortions. We have taken as a definition of criminal abortion only those cases induced by the local application of an outside agency, whether done by an abortionist or by the patient. Our experience seems to show that self-induced abortions brought on by drugs, exhaustion, and other agents cause little or no more trouble than the innocent accidental abortion. Either, of course, may cause a true post-abortal sepsis. The number of abortions admittedly criminally induced, whether self-induced or by an abortionist, constitutes an extraordinary percentage of the whole. Our definition of criminal induction does not include that vast field of inductions caused by drugs, such as castor oil, quinine, and many proprietary preparations containing ergot or its derivatives. We have listed as criminally induced only those cases in which actual interference had taken place via the vaginal route. Of these there were 16. Only 2 were admittedly brought on by the services of an abortionist. The great majority of criminally induced were apparently self-inductions. One reason, we believe, is because this city is, on the whole, fairly free from such practitioners, and the other and best reason is that those people who attend the free clinics of a general hospital cannot afford the attention of such experts. The extremes that these women may go to to rid themselves of their pregnancies apparently know no bounds. Such criminal inductions are, of course, potentially infective cases. Of course, many criminal inductions may run a perfectly normal convalescence, while many purely accidental abortions may become infected. Naturally this does not detract from the teaching that all criminally induced abortions must be treated with suspicion until free from danger.

We prefer the term "infected abortion" to the more commonly used "septic abortion". We prefer it because sepsis implies usually generalized septicæmia, whereas by no means all infections in abortion become generalized. Our definition of infected abortion is an arbitrary one from a morbidity standpoint, and entirely of our own making. We have classed all abortions as infected which had a temperature of 101° or over on two successive days, including the day of admission. Under this definition infections were classified as follows:

TABLE I

	No.	Clean	Infected	Per cent
Complete abortion.....	10	10	0	0
Incomplete abortion....	28	14	14	50
Threatened abortion....	3	3	0	0

Of the 10 cases of complete abortion, 3 were therapeutic, done at the instigation of the medical side for various reasons. There was no morbidity. We are unable to get a definite history of criminal interference in any one of the remaining 7 cases. Three admitted using drugs, hot baths, etc., but we had every reason to suspect 3 out of the 7 of having employed mechanical interference. However all ran a perfectly normal convalescence. It is probably quite uncommon for an empty uterus to become infected. In other words, it is not the uterus that becomes infected primarily; it is the content, as a general rule.

Of the 28 cases of incomplete abortion, 14 were classified as infected. It must be pointed out that although 17 cases admitted criminal interference, not all those cases can be included among the subsequent infections. Some of them ran perfectly normal charts and so are among the 14 clean cases. By the same token, some of the innocent or accidental abortions became febrile and appear among the 14 infected cases. The cause of the great difference between the percentages of infection in the complete and incomplete groups is, as pointed out, that in the latter there is a uterine content to infect. If this last is a reasonable assumption, why not empty every uterus at once by curettage and so offset any risk of infection? In reply the following statements seem reasonable: (1) We know that any remnant of the gestation products remaining may be infected before we could so act, and that, if so, nature has already established its protective zone. (2) We know that no radical procedure can be instituted without some degree of trauma which we believe detracts from the organ's defences. (3) We know that no form of radical removal of the remaining products of gestation is certain to be thorough and complete. (4) We know that any intrauterine procedure at such a time may carry bacteria into a uterus heretofore uninfected.

Our treatment of infected incomplete abortion, as of the uninfected case, is strictly

supportive throughout. The initial procedure of observation of the cervix and vagina, with removal of any loose pieces of the gestation product is carried out, and the usual treatment for any acute suppurative condition is instituted. *No attempt at antisepsis* in any form is used. The patient herself is asked to combat the infection through her own body fluids. The duty of her attendants is to aid her in this task in every way.

Rest in bed, posture, quiet, sleep, daily bowel movements without purges, forced fluids, analgesics, heat to the abdomen, intravenous injections of saline, blood transfusions, and scarlet fever antitoxin are the essentials. The above treatment is routine except for the last three procedures mentioned. Intravenous injections are given freely, as ordered, with thorough belief in their worth, always keeping in mind that a heart already taxed to capacity may well become overtaxed by a sudden increase in circulatory content. We believe small intravenous salines given often are wiser than the larger amounts of 1,000 to 1,500 c.c.

Transfusions.—Blood counts are taken often in febrile cases, or in those losing any quantity per vaginam, usually every 48 hours. When the blood condition drops any appreciable distance we resort to blood transfusions. Again we recommend small transfusions repeated, rather than a large addition to the blood content. There is an added and most important reason here, too, in that added fresh healthy blood means added antibodies and so added ammunition to the fighting forces of the host. Repeated addition of shock-troops at intervals seems to get better results than a combined attack at one time. A transfusion of not more than 500 c.c. at one time seems the most satisfactory procedure. Of the 14 infected cases treated, 7 required blood transfusions one or more times. Of course, a number of afebrile cases of incomplete abortions in our series also were treated with blood transfusions.

Scarlet fever antitoxin.—We reserved the use of scarlet fever antitoxin for those cases of infected abortion whom we considered seriously ill. Due to the fact that so much criminal interference took place there were some particularly virulent infections. Marked toxicity, as shown by high temperature, rapid pulse, great fluid

depletions, blood destruction, extensive cellular infiltration about the seat of infection, peritonitis, etc., was to be seen in many of these infected patients. The reaction of these people to scarlet fever antitoxin was satisfactory in every case, but the results are in some cases so remarkable that one might well hesitate to report them in so small a group. We realize fully that reporting the treatment of a small number of abortions might well give results that would lead to erroneous conclusions. In our miniature series we had remarkable results. It is true that perhaps such results will not occur again, but we feel that the results should be published to show that in scarlet fever antitoxin we have at least an additional weapon, perhaps a very valuable one, in the fight against infected uteri. It is known, however, that a great number, probably 50 per cent, of intrauterine infections are due to a hæmolytic streptococcus. The strain of streptococcus which causes scarlet fever is now known to be a hæmolytic strain, and its antitoxin has, at times at least, a surprising effect on the toxin produced by the streptococcus hæmolyticus gravidarum.

We have used the serum both intramuscularly and intravenously, on separate patients, and on the same patient. In our very limited experience we could see no advantage either way, so now use the serum intramuscularly altogether. We have given minute doses at the beginning to immunize against anaphylaxis, but of late have given the full dose at once and have found little to worry about from that standpoint.

Urticarial rashes are almost always the rule following this medication. Many patients have a violent skin reaction and are miserable until treated. We have controlled the rash very effectively with adrenalin. One case of acute arthralgia followed the use of the serum. The patient refused to move herself and was moved only with intense pain. At no time was there any localized swelling or redness, nor was there any febrile reaction. The patient recovered in 24 hours without specific treatment. We realize that other clinics with far more experience are using much larger doses, even three times, for the original dose than we do. We can only say that we have not felt the need for this, and our results, in this very limited number of cases, speak for themselves.

A number of temperature charts of the infected cases treated with the scarlet fever antitoxin are here presented. The histories are not appended, as it is felt that they would add little beside space to the discussion. You are referred

TABLE II

		Induced	Accidental	Blood transfusion	Scarlet fever serum	Vaginal pack	Curettage	Days in Hospital	Recovered	Re-admitted to Hospital
1	C.43768	1			20			16	1	1
2	C.47368	1			20			6	1	
3	C.42577	1						12	1	1
4	C.42139	1		1		1	1	25	1	1
5	C.41833	1		1				31	1	
6	C.43062		1	1				17	1	
7	C.43469	1		1	40			19	1	
8	C.46643		1		40			6	1	
9	C.44108	1		1				10	1	
10	C.45920		1					8	1	
11	C.46765	1			40			8	1	
12	C.46612	1		1	60			20	1	
13	C.46854		1	1	20			22	1	
14		1			20			9	1	
Totals.....		10	4	7	8	1	1	209 (Aver. 15)	14	3

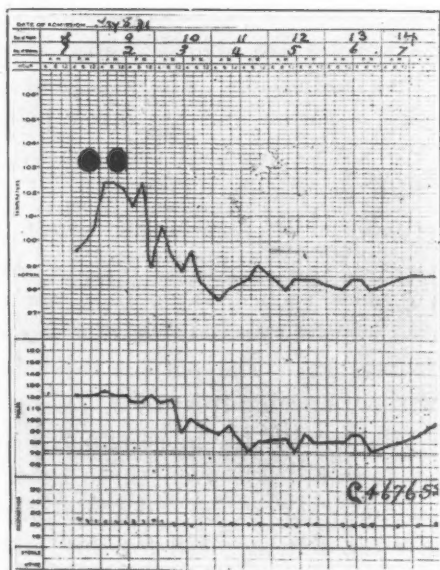


CHART 1.—Case No. 46765. The black dots represent scarlet fever antitoxin injections.

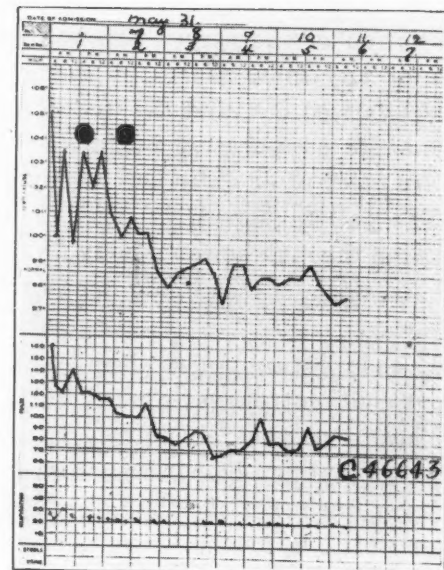


CHART 2.—Case No. 46643. Acutely ill. The black dots represent scarlet fever antitoxin injections.

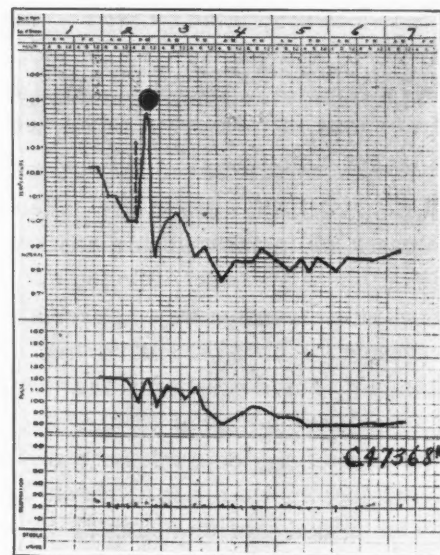


CHART 3.—Case No. 47368. A remarkable result, apparently from one scarlet fever antitoxin injection.

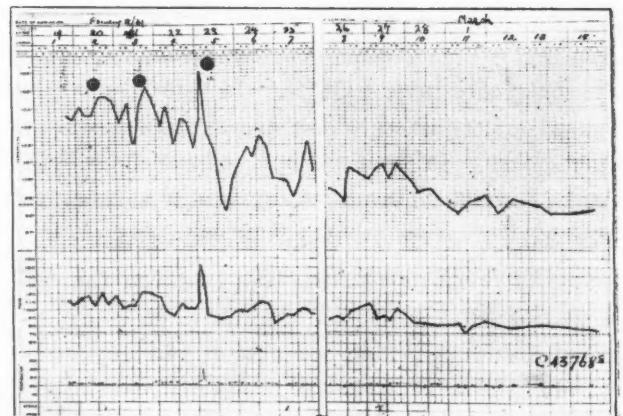


CHART 4.—Case No. 43768. Very gravely ill, with a remarkable result following the third injection scarlet fever antitoxin.

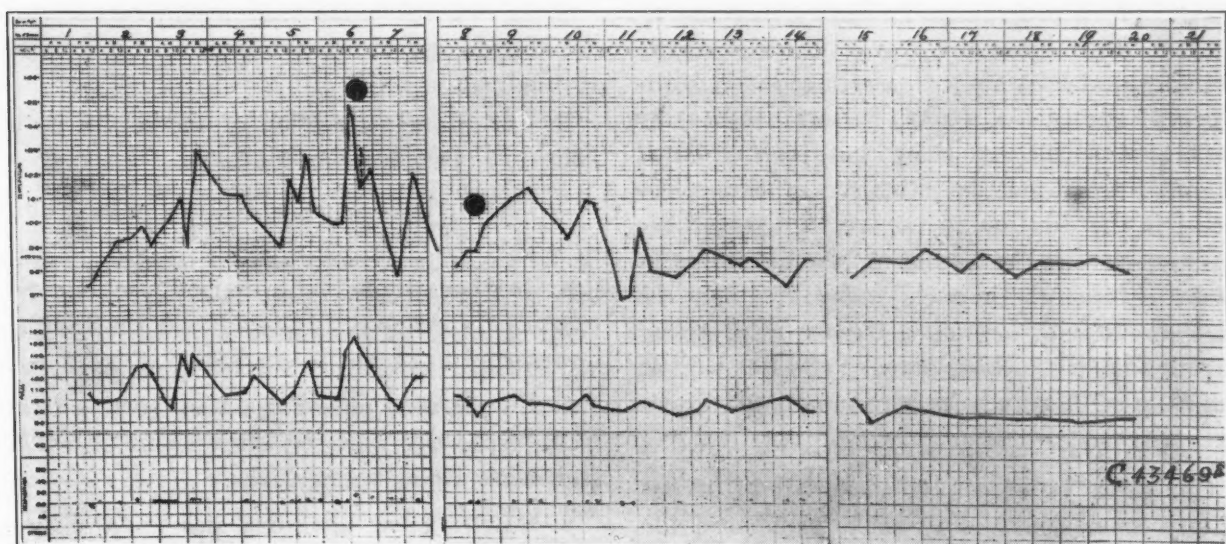


CHART 5.—Case. No. 43469.

CHART 6.—Case No. 46612. An intractable case *in extremis*, with the result following the third scarlet fever antitoxin injection.

by the hospital number on the chart to the hospital number in Table II for a graphic analysis of the cause of illness and treatment.

Case No. 43,768, one of our scarlet fever antitoxin cases, was subsequently readmitted to hospital because of a "lump in her abdomen." The lump turned out to be a marked cellular infiltration which subsequently had to be drained, and the patient made a slow and tedious recovery. Two other cases were readmitted. No. 42,577 came back complaining of vague pains. Physical examination was negative and she was discharged in three days without complaints. No. 42,139 is the only patient in our series whom we packed vaginally and whom we subsequently curetted. On her second admission she com-

plained of bleeding only. Posture, medication, transfusion, all gave little or no result. The uterus was somewhat retroverted, somewhat enlarged, and the position could not be corrected. We packed the vagina, to stop a pretty free and depleting flow and in the hope of bringing away intrauterine content. Failing this she was curetted, the only case in which we found it necessary to give radical treatment.

It will be noted that no reference to blood cultures has been made. It is generally felt, we know, that no study of this sort can be really scientific without blood cultures in all toxic cases. Blood cultures have been taken on a few of these cases—all negative. A number of factors have led us to stop the practice of routine cul-

tures. (1) Blood culture findings were unnecessary in determining our plan of treatment. (2) Our hospital laboratory is a tremendously over-worked institution. (3) Recent studies by expert bacteriologists show that positive blood findings are decidedly a matter of chance, so great is the dilution in the average case. We strongly favour the taking of blood cultures in those clinics where such procedure may be carried out with impunity, but we respectfully submit that the lack of same should not belittle the facts of this study as here-presented.

SUMMARY

Our series is, of course, too small to permit of any conclusions. We wish to summarize the discussion briefly, as follows:

1. In incomplete abortion, whether uninfected or infected, a conservative treatment is followed throughout.
2. The initial inspection of the cervix is, we believe, a valuable procedure.
3. Hæmorrhage is not a feature to be feared, as a general rule.
4. Neither vaginal nor uterine packing, nor oxytocics were used. It is advised that neither be resorted to except in emergency.
5. Emphasis is placed upon supportive treatment, especially repeated intravenous injections and small blood transfusions.
6. Scarlet fever antitoxin has apparently a place in the fight against intrauterine infections.

THE X-RAY TREATMENT OF UTERINE HÆMORRHAGE AND UTERINE FIBROIDS*

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X

AMONG the outstanding memories of ten years spent in general practice are the worries associated with the treatment of aggravated and persistent uterine hæmorrhage, especially those occurring about the menopause. Ergotin and stypticin, curettages, rest in bed, cervical and vaginal packing often proved of no avail. In many cases the major operation of hysterectomy was necessary. These severe cases still frequently occur in the practice of every family physician, but an easier and safer method of treatment is now possible of application. And it is the hope of the writer that, through the publication of this and other communications in our *Journal*, every family physician in Canada may become familiarized with the benefits which the radiotherapist can confer through the treatment by x-ray of these severe conditions.

At the convention of the Canadian Radiological Society, in 1923, and again at the conven-

tion of the Radiological Society of North America in 1929, the writer presented the results of a series of treatments by x-ray of uterine hæmorrhage and associated conditions. Statistics were furnished covering a period of fourteen years, showing that the x-ray treatment of uterine hæmorrhage is good for 100 per cent cure, providing that uterine malignancy has been ruled out. One hundred consecutive cases of uterine hæmorrhage and uterine fibroid were analyzed. The subsequent history of 85 of these cases is known. With the exception of 3, which proved to be malignant, there was no case of failure to arrest the hæmorrhage. This uniformity of good results is confirmed by the experience of every x-ray worker who has compiled and reported his results. It is not the purpose of this paper to make any detailed reference to these statistics. The files of the leading x-ray journals are teeming with the facts.

In the series of 100 cases reported by the writer the hæmorrhage was of all degrees of severity, but mostly of the aggravated type. There were severe hæmorrhages, sudden in onset and profuse in amount, many of the patients

* This paper is No. 10 in the series on Physiotherapy. For the preceding articles see the *Journal*, 1931, **24**: 263, 409, 539, 679, 831; and 1931, **25**: 65, 164, and 444.

affected coming to the treatment table on the stretcher. There were other hæmorrhages of more moderate degree, but extending over a period of months. Some were due to fibroid changes in the uterus, while in others there was no demonstrable change except subinvolution; a number were associated with chronic inflammatory changes in the uterine adnexa; some were associated with large uterine fibroids. In some cases uterine fibroids were treated when there was no accompanying hæmorrhage. In these the uterus reverted to normal size and consistency after treatment. Many of the patients evidenced such a profound degree of anæmia as to require blood transfusion. No case of hæmorrhage was too ill to treat, and some reported failure to respond to treatment.

The technique employed cannot be gone into except in a general way. The details of treatment should be carried out only by one who has had special training in radiotherapy, and who is giving practically all his attention to x-ray work. For the physician who is only occasionally operating an x-ray machine to attempt the x-ray treatment of uterine hæmorrhage is hazardous in the extreme. Overdosage will precipitate a type of menopause that will be extremely stormy both for the patient and the family physician, while underdosage will probably only aggravate the hæmorrhagic condition.

The referring physician should, however, be in a position to give some information to the patient concerning the length of time the treatment will require. Most radiotherapists agree that the treatment should cover a period of about three months, that is, there should be three series of treatments, with monthly intervals between each series. For the carrying out of the treatment of each series there are two methods which may be employed. One method requires a heavy dosage given over a short period of time; the other requires a smaller dosage with more extended time. Both methods give equally good results. The writer uses the latter method, preferring to tax the patient's time rather than run the risk of overtaxing her resistance. By giving smaller doses and extending the treatment over a longer period of time he believes that he makes more allowance for the exercise of the natural recuperative power of the patient, already un-

dermined by the hæmorrhage, and further depressed by the x-ray treatment. Each series is usually carried over 6 days, 10 minutes being given each day. If the patient is not severely ill the series is given in 3 days, 20 minutes being given each day in divided portions of 10 minutes each.

The patient should be warned that frequently there may be quite a severe hæmorrhage following the first series of treatments, and occasionally following the second series. Failure to give this warning may cause the patient undue alarm, and may make subsequent explanations difficult.

The contraindications to the use of x-ray in the treatment of uterine hæmorrhage are few and definite. Associated pelvic inflammatory conditions do not constitute a contraindication, provided that a pus tube or some other local pus pocket is not present. These inflammatory conditions may be a contraindication to the intrauterine use of radium, especially after a curettage, where an acute localized inflammatory reaction is not desired, but they do not preclude the use of x-ray. The striking results secured in the x-ray treatment of boils and carbuncles find an analogy in the magic disappearance of pelvic inflammations after a course of x-ray therapy.

The presence of malignancy is a contraindication for the use of x-ray alone, to the exclusion of surgery and radium. Where there is any suspicion aroused, such as by the character and odour of the discharge, or the suggestion of degenerative uterine changes is elicited on bimanual examination, a diagnostic curettage should be done, and the detritus subjected to pathological examination. In spite of careful and painstaking examination the malignancy may not evidence itself until later, as in the three malignant cases appearing in the series reported by the writer. Another contraindication to the use of x-ray treatment is the presence of urgent pressure symptoms from a large or incarcerated fibroid tumour. Surgery is then the treatment of choice.

Excessive size of a fibroid tumour may be a contraindication to the use of the x-ray, on account of the prolongation of treatment necessary, and the profound intoxication often associated with the absorption of products released during the retrogression of such a

tumour. Surgery is preferable in such cases. Another contraindication is the subserous pedunculated fibroid which permits of torsion and possible strangulation. This is better removed surgically. A submucous fibroid may give rise to subsequent hæmorrhage after an apparent cure. If this hæmorrhage does not yield promptly to further x-ray treatment surgery should be employed.

The x-ray treatment of uterine hæmorrhage in women during the productive period should be generally avoided. Two such cases occurred in the writer's series. They each received a treatment that was but a fraction of that usually given. Hæmorrhage was controlled, and subsequent menstruations were normal. In spite of these successes, we have generally discouraged the reference of women in the child-bearing period, fearing the effect of radiotherapy on possible future offspring. There is experimental evidence which indicates that the germ cell may be so modified by irradiation as to establish hereditary abnormalities, not in the immediate offspring, but in descendants one or more generations removed.

The "modus operandi" of the x-ray in the arresting of uterine hæmorrhage and the reducing of uterine fibroids is generally regarded as the combination of a number of actions. Radiation is essentially a destructive process, involving the disappearance of the immature rapidly growing fibroid cell and its replacement by connective tissue. Besides the direct action on the immature cell there is an action on the blood vessels of the parts. An endarteritis is produced which results in the shutting-off the blood supply of the growing tumour, and reduction in the engorgement of the subinvolted bleeding uterus. In addition there is a direct action on the ovary. The Graafian follicle is either destroyed or undergoes cystic degeneration. The corpus lutea and the internal secretion of the ovary are depressed, but, when the proper dosage is administered, they are not destroyed. For, the artificial menopause following radiotherapy, as we have observed it, does not differ, in kind or degree of severity of symptoms, from the normal climacteric.

EPIDEMIC STREPTOCOCCIC INFECTIONS WITH SPECIAL REFERENCE TO THE SCARLET FEVER TOXOID IMMUNIZATION OF DICK-POSITIVE ADULTS*

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THE relatively crowded condition in asylum communities predisposes the members to epidemics of contagious disease. The lack of personal hygiene increases this tendency. However, recognition of such epidemics and their control is much easier, in that one knows all the patients and sees all of them every day, this being quite a different state of affairs from that found in private practice. A small, straggling epidemic of scarlet fever began at the Verdun Protestant Hospital in the fall of 1929 and continued throughout the winter. There were about 15 cases in all, and no deaths. It is interesting

to note that during the time these scarlet fever cases were developing, streptococcic sore throats and erysipelas were in evidence. In fact, the sore throats, complicated by otitis media in three cases and by quinsy in four others, caused us more worry than the scarlatina. Erysipelas was responsible for one death.

Dick¹ has conclusively shown, in our opinion, that there is no direct connection between erysipelas and scarlet fever. The severe nature of the streptococcic sore throats as compared with the mild scarlet fever infections in our cases suggests, at least, that these two groups were due to different organisms.

We were unable for some time to locate the source of the infections. The onset of the epidemic was gradual and there were never more

* From a clinic at the Verdun Protestant Hospital, under the direction of Dr. C. A. Porteous, Medical Superintendent, whose help and advice the writers gratefully acknowledge.

than one or two cases ill at one time. Finally, a workman who helped in the pasteurizing room was found to have a purulent otitis media. No cultures were made, but his services were dispensed with. Another man, an assistant cook, and a good one, was found to have an otitis media. We were able to keep this man working, as he used careful personal hygiene and had his ear cleansed twice daily by a nurse; operation was contraindicated.

We considered testing by the Dick method our total population and immunizing the positive cases. We were able, with the aid of the Connaught Laboratories of the Toronto University, to apply this in over 900 cases by the end of 1930; among these we found 5.3 per cent positive reactions, a total of 48 cases. This is a low percentage, even for an adult population. As we now had a definite record of susceptible cases in our large population of over 900, and the epidemic having stopped, we felt justified in attempting to immunize some of these with scarlet fever toxoid, a new and untried preparation, and to check the results with a partial immunization with scarlet fever toxin. This feature of the work was recommended and supervised by the Connaught Laboratories of Toronto University. The 47 available Dick-

positive cases were divided into two groups. The first 24 were immunized during February, March and April, 1931, with four doses of toxoid prepared from toxin containing 20,000 skin test doses per c.c. and residual toxin to the extent of about 250 skin test doses per c.c. The doses were 0.25, 0.5, 1 and 2 c.c. at two-weekly intervals. Thus each patient received a total of 3.75 c.c. of the formalinized product of 75,000 skin test doses toxin. On April 29th these cases were given three intracutaneous tests: (1) Dick; (2) 1 skin-test dose of toxoid; (3) 5 skin-test doses of toxin. The 5 skin-test dose of toxin was used in the hope that most cases were immune to these tests. The results are summarized in Table I. The remaining 23 cases were immunized with four doses of regular scarlet fever toxin, 0.5 c.c., strength "A", 1 c.c., strength "A", and 0.5 c.c. strength "B", 1 c.c. strength "B". Hence they received a total of 2,000 skin test doses of scarlet fever toxin. This was not expected to produce much immunity. They were given the same intradermal tests after immunization was completed and gave practically the same results, that is to say, 3 cases of the 22 gave positive reactions to a 5 skin-test dose of toxin. The other cases were negative (see Table II).

TABLE No. I

POSITIVE DICK TESTS IN 900 CASES AND RESULTS OF PARTIAL
IMMUNIZATION WITH DOCHEZ SCARLET FEVER TOXOID

Case No.	First Dick Test	Immunization finished April 8, 1931	Dick Test April 29, 1931	1. S.T.D. Toxoid April 29, 1931	5. S.T.D. Toxin April 29, 1931
1. G.A.	+	Toxoid Dochez	Negative	Negative	Negative
2. S.P.	+	" "	"	"	"
3. L.M.	+	" "	"	"	"
4. M.B.	+	" "	"	"	"
5. J.C.	+	" "	"	"	"
6. W.E.	+	" "	"	"	"
7. R.M.	+	" "	"	"	"
8. P.B.	+	" "	"	"	"
9. H.B.	+	" "	"	+1/2"	+1"
10. J.M.	+	" "	"	Negative	+1/2"
11. T.W.	+1/2"	" "	"	"	Negative
12. P.A.	+1/2"	" "	"	"	"
13. B.R.	+1/2"	" "	"	"	"
14. V.I.	+1/2"	" "	"	"	"
15. H.E.	+1/2"	" "	"	"	"
16. D.Y.	+1/2"	" "	"	"	"
17. C.H.	+1/2"	" "	"	"	"
18. M.A.	+1/2"	" "	"	"	"
19. D.A.	+1/2"	" "	"	"	"
20. G.F.	+3/4"	" "	"	"	"
21. A.L.	+2"	" "	"	"	"
22. N.S.	+1 1/2"	" "	"	"	"
23. M.C.	+1"	" "	"	"	"
24. R.R.	+1"	" "	+1/2"	+1/2"	+3/4"

TABLE No. II
POSITIVE DICK TEST IN 900 CASES AND PARTIAL IMMUNIZATION WITH
SCARLET FEVER TOXIN

Case No.	First Dick Test	Immunization complete April 8, 1931	Dick Test April 29, 1931	1. S.T.D. Toxin April 29, 1931	5. S.T.D. Toxin April 29, 1931
25. L.H.	+1"	Scarlet Toxin	Negative	+1/2"	+3/4"
26. D.A.	+1"	" "	+1/2"	+1/2"	+3/4"
27. B.A.	+1"	" "	+1/2"	+1/2"	+1"
28. W.H.	+3/4"	" "	Negative	Negative	Negative
29. P.A.	+1/2"	" "	"	"	"
30. E.D.	+1/2"	" "	"	"	"
31. S.D.	+1/2"	" "	"	"	"
32. F.T.	+1/2"	" "	"	"	"
33. B.G.	+1/2"	" "	"	"	"
34. B.A.	+1/2"	" "	"	"	"
35. L.Y.	+1/2"	" "	"	"	"
36. A.B.	+1/2"	" "	"	"	"
37. C.Y.	+1/2"	" "	"	"	"
38. H.G.	+	" "	"	"	"
39. P.H.	+	" "	"	"	"
40. A.M.	+	" "	"	"	"
41. S.C.	+	" "	"	"	"
42. A.C.	+	" "	"	"	"
43. F.G.	+	" "	"	"	"
44. C.J.	+	" "	"	"	"
45. H.W.	+	" "	"	"	"
46. C.W.	+	" "	"	"	"
47. R.R.	+	" "	"	"	"

This is an incomplete report, it is true, in some respects. We would like to test the series with graded intradermal tests to get an accurate conception of this toxoid's immunizing properties as compared with that of the regular toxin. However, many of these patients will be under observation for some years, and future events may prove interesting.

CONCLUSIONS

1. A *clinical* relationship between scarlet fever, erysipelas and septic sore throat occurring in this epidemic manner was noted.

2. When a pasteurizing plant worker with otitis media was removed, all three epidemics subsided.

3. Nine hundred patients were Dick-tested, and 5.3 per cent were found to be positive.

4. Scarlet fever toxoid in divided doses, totalling 3.75 c.c., produced an immunity to at least five skin-test doses of toxin in 87.5 per cent of our series.

5. Scarlet fever toxin in four doses, totalling 2,000 skin-test doses, produced an immunity to at least five skin-test doses in 86.5 per cent of our series.

Our thanks are due to D. T. Fraser, M.D., assistant director of the Connaught Laboratories of Toronto University, for the material used, and especially for his interest and supervision.

REFERENCE

1. DICK, *International Clinics*, 1930, 1: 150.

Rheumatic fever is economically one of the most important diseases, not only because of its acute manifestations, but also because of its rôle in the production of between 30 and 40 per cent of chronic cardiac disease in the latitude of the North Atlantic States. Microscopic findings indicate it to be a widespread disease involving by preference mesenchymal structures or mesenchymal portions of parenchymatous organs. Physiological stress and strain appear to favour localization of its manifestations, although it may be locally active without giving rise to symptoms; and various vulnerable organs may be either simultaneously or independently involved—H. F. Swift, *Bull. New York Acad. Med.*, 1931, 7: 442.

Health is, indeed, so necessary to all the duties as well as pleasures of life, that the crime of squandering it is equal to the folly; and he that for a short gratification brings weakness and diseases upon himself, and for the pleasure of a few years passed in the tumults of diversion and clamors of merriment condemns the maturer and more experienced part of his life to the chamber and the couch, may be justly reproached, not only as a spendthrift of his happiness, but as a robber of the public; as a wretch that has voluntarily disqualified himself for the business of his station, and refused that part which Providence assigns him in the general task of human nature.—Samuel Johnson.

AVERTIN IN SURGICAL ANÆSTHESIA*

BY FRASER B. GURD, B.A., M.D., C.M., F.R.C.S. (CAN.), F.A.C.S. AND
WESLEY BOURNE, M.D., M.Sc., F.R.C.P. (CAN.),

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HAVING made ourselves thoroughly acquainted with the earlier literature on tribromethanal (avertin)^{1, 2, 3} and being familiar with the more recent work done on its effects, we have analysed the available data. This information may be recorded seriatim as follows:

(1) Avertin has very little action upon the normal or impaired liver.^{4, 5, 6} (2) It produces relatively slight kidney depression.⁴ (3) It does not affect the carbon dioxide combining power of the plasma, provided cyanosis is avoided, yet pH determinations point to a mild degree of acidosis.⁴ (4) It lowers the body temperature but little.⁴ (5) Although it brings about an initially transient blood dilution, this is followed by some concentration.⁴ (6) Ephedrine will interrupt or considerably shorten avertin anæsthesia.⁷ (7) When ordinary doses are employed there are no harmful effects on the circulation; this conclusion is arrived at as the result of observations made from studies on heart-lung preparations and the mechanical heart.⁸ (8) Finally, the administration of adrenalin may produce serious cardiac irregularity during avertin narcosis.⁸

From the foregoing it may be noted that the only deleterious action of this bromine substitution product of ethyl alcohol is depression of respiration. In view of the fact that this depression can be avoided by accuracy in the measurements of body weight and amount of drug, by its slow administration, and if necessary offset by the administration of carbon dioxide and ephedrine,⁷ we are of the opinion that the drug may be used with safety and that it possesses many advantages.

Although tragic results from the use of avertin have been reported from a few clinics, more especially European, we are of the opinion that recent experimental work upon the effects of the drug, particularly upon its toxic properties, has indicated the technique whereby it may

be safely used. We are of the opinion that the drug should be used simply as a basal anæsthetic and that under no circumstances should a dose of more than 0.10 gram per kilogram of body weight be employed; as a matter of fact we would urge the employment of a dose just less than the foregoing. When such a dose is slowly administered the patient will be found to be peacefully asleep after a lapse of about twelve minutes from the commencement of the rectal instillation. About thirty minutes after the commencement of the introduction of the anæsthetic, the patient will be found so soundly asleep that he is only with great difficulty aroused. We believe that sleep should not be sufficiently deep to make it possible to incise the skin without a response on the part of the patient. We consequently are of the opinion that novocain nerve blocking or infiltration should be employed for the skin incision. For this purpose adequate anæsthesia is very easily obtained with the administration of a dose of novocain approximately one-fourth of that which would be rendered necessary were the basal anæsthesia not in existence. When the necessities of operative interference demand traction upon the tissues, nitrous oxide and oxygen have been employed for the period in which such painful stimuli are necessary.

A study of 70 cases has been made, 38 males and 32 females, of an average age of 35.5 years, ranging from 8 to 68 and of an average weight of 59.9 kilograms (131.8 pounds), between 25 and 93.7 kilograms (55 to 206 pounds). There were 14 herniotomies (2 double inguinal, 10 single, 1 femoral and 1 extensive post-operative with adhesions); 24 laparotomies,—14 appendicectomies and 10 major stomach and biliary tract operations; 12 operations on the extremities (fractures, etc.); 3 minor gynecological operations; 2 thyroidectomies (toxic); 1 brain tumour; 2 rib resections; 1 tonsillectomy; 3 radical mamnectomies; 3 plastics on the eye; 1 wiring of the teeth for fracture of the lower jaw; 1

* From the Western Division of the Montreal General Hospital.

submucous resection of the nasal septum and 1 resection of the coccyx (for fracture); and two hæmorrhoidectomies.

The usual dose was 0.10 gram per kilogram of bodyweight, but in six instances this was reduced to 0.08, 0.085 and 0.090 per kilogram in three, one and two cases respectively, in consideration of loss of weight or infection. The accurately measured watery solution of 2.5 per cent avertin fluid was allowed to flow into the rectum during ten minutes. We desire to stress the importance of this very slow instillation in offsetting the only serious factor in avertin anæsthesia, that is, respiratory depression. Straub⁹ has shown that 90 per cent of the drug is absorbed from the rectum in twenty minutes, whereas the water itself takes a much longer time and Raginsky and one of us (W.B.)¹ have drawn attention to the seriousness of allowing the material to be instilled too quickly.

Although in exceptional cases in dealing with extremely nervous patients it is proper to introduce the drug while the patient is still in his bed, we agree with previous writers³ on the subject that it is probably better to introduce the drug after the arrival of the patient at the operating room. It is, we believe, important that absolute quiet be maintained during the early stages of sleep induction and believe also that it is inadvisable to disturb the patient until narcosis is complete.

As a cogent reason in favour of being very scrupulous in adherence to the safe dose, attention is drawn to the fact that in our short series there were no less than six who did not require inhalation anæsthetics or novocaine, so profoundly anæsthetized were they that they might be considered as being almost on the borderline; in particular there was one whose belly was thoroughly explored while there was complete relaxation. Had the risk been taken of giving more than 100 mg. per kilogram in this case, the man's life might have been seriously jeopardized, or again had one given the same dose too quickly, even then one might have caused very serious results. In other words, it would have been wiser to have considered his natural scrawniness in spite of the fact that he had not lost weight. Another, an anæmic, cachectic and wasted chest case was very deeply narcotized by 85 mg. per kilogram for three and a half hours. A third, stated age 68, (we

believe more) with toxic goitre, operated on six weeks previously for perineal repair at which time there were signs of cardiac fibrillation under nitrous oxide and ether, required no more than procaine infiltration along with the 100 mg. per kilogram of avertin. She was unnecessarily too far under. Then the brain tumour case, which, although hopeless in any event, might better have received less than 100 mg. per kilogram. Finally, one with quantities of pus in the pelvis (salpingo-oophoritis) had 80 mg. per kilogram and required no more than a nitrous oxide and oxygen mixture with carbon dioxide. Dandy¹⁰ has recently reported 250 cases in neurological surgery with credit to avertin. He is to be praised for conservatism in reducing the dose.

The smoothness of "going under" is very impressive and constitutes a nearer approach to natural sleep than with any other anæsthetic, the sensations being identical with those of physiological fatigue and the desire to sleep.

Even more interesting than the smoothness with which the patient goes to sleep has been the manner in which the patient has wakened up from the anæsthetic. We have made it a habit to visit the patient about three to five hours after the commencement of the operation, at which time the patient usually awakens up, although still very drowsy. We have been impressed by the fact that almost invariably the first return of consciousness has been indicated by a smile and that the patient, if he makes any comment at all, indicates his well-being and feeling of happiness. In cases in which in the very nature of the case the interference has been followed by pain, it has been our custom to order an adequate dose of morphine or substitute, with the result that, as a rule, after having wakened up once for a short time about three to five hours after the commencement of operation, the patients have usually gone to sleep again for a further period of about four hours. Needless to say, during these eight or nine hours of unconsciousness, most of the usual unpleasant disturbances following operation are avoided.

There were eight instances of early post-operative nausea, of which one was a case of brain tumour; this case was *in extremis* when placed on the table and died the following day; another of post-operative herniotomy with very

extensive adhesions in which a severe degree of shock occurred. The others suffered very little and it is impossible to say whether the nausea was in any way due to avertin. In three other cases vomiting took place several hours after operation—one from hæmorrhage after gastro-enterostomy, one concomitant with the development of ileus and one 12 hours post-operative on a very hot day. Avertin may not be blamed for these. Two cases had headache after and neither of them had had any inhalation anæsthetics, one was slight and the other severe; both were of the highstrung and introspective type; both were readily amenable to treatment.

CONCLUSIONS

We believe that the combined anæsthesia induced by the rectal administration of small doses of avertin, relatively small doses of novocain and very small doses of nitrous oxide (rarely with the necessity for the employment of ether) is, from the patient's point of view the most pleasant that we have hitherto employed, while operations under such conditions

are associated with less shock than by other methods and there is a greater freedom from disturbing phenomena. From the surgeon's point of view, this type of anæsthesia has been adequate, is not associated with any increase in bleeding, is accompanied by complete relaxation, and has been free from straining on the part of the patient.

Although the majority of the cases reported in this contribution were under the care of the surgical author (F. B. G.), consecutive cases operated upon in the Western Division of the Montreal General Hospital, in which avertin anæsthesia was employed, are included. We wish to thank the other surgeons and specialists for permission to make use of their cases. Among this group our thanks are due to Drs. C. C. Gurd, Bramley Moore, Howard Reilly, J. G. W. Johnson, Albert Ross, V. Heney, and W. I. Whitehead.

REFERENCES

1. WILLSTÄTTER AND DURSBERG, *Beitr. d. deutsch. Chem. Ges. Ussch.*, 1923, 53: 2283.
2. EICHHOLTZ, *Deutsche med. Wchnschr.*, 1927, 53: 710.
3. AUSCHUTZ, SPECHT AND TIEMANN, *Die Avertinnarkose in der Chir.*, Springer, Berlin, 1930.
4. BRUGER, BOURNE AND DREYER, *Am. J. Surg.*, 1930, 9: 182.
5. WATERS AND MUEHLBERGER, *Arch. Surg.*, 1930, 21: 887.
6. BOURNE AND RAGINSKY, to be published shortly.
7. RAGINSKY AND BOURNE, (in press) *J. Pharm. & Exp. Therap.*
8. *Ibid.*, (in press) *J. Pharm. & Exp. Therap.*
9. STRAUB, *Munch. med. Wchnschr.*, 1928, 14: 593.
10. DANDY, *J. Am. M. Ass.*, 1931, 96: 22, 1860.

A FEW REMARKS ABOUT THE TREATMENT OF RHINOPHYMA

BY ALBÉRIC MARIN, M.D.,

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RHINOPHYMA is the monstrous hypertrophy of the end of the nose. This deformity is the final evolution of the rosacea with folliculitis.

The local treatment of rhinophyma differs according to the stage of its evolution. At the onset, when it is still rosacea, strong sulphurated lotions and, notably, cryotherapy give excellent results. Carbonic dioxide snow is the treatment of choice for the rosacea when it presents but little folliculitis and fine telangiectasæ. Massage is a good adjunct.

At a later stage, when the skin is hypertrophied and the small veins which run into it are numerous and dilated, and folliculitis is marked, we must have recourse to more active measures. Positive electrolysis will block the vessels. Crossed linear scarifications will chop the telangiectasia and the sebaceous glands. Careful applications of filtered x-rays will diminish the recurrence of folliculitis. Never-

theless, these diverse treatments are insufficient when the affection becomes a genuine rhinophyma and the nose develops extraordinary proportions. We must then act energetically to free the patient from this painful deformity which poisons his life by rendering him a subject of curiosity, of derision and sometimes of aversion.

Decortication is the operation to be adopted. This consists in removing the excess of tissue, care being taken not to remove them too deeply, in order to leave sufficient tissue for epithelialization. With the knife, we carve a new nose. This, when well done, will leave a normal epidermis. As has been said, rhinophyma is mostly constituted of enormously hypertrophied sebaceous glands; the operator removes but the excess, leaving the deep portion of the sectioned glands to act as islets of epithelialization. Should the knife cut too deeply, it will be a cicatricial tissue

and not a normal skin which will re-cover the nose.

Some authors recommend the use of high frequency currents, employed either for coagulating the rhinophyma or for endothermic ablation. We are not of this opinion. With the electrocoagulation or with the radio knife we must proceed by stages, coagulate or excise at different intervals: "The treatment should be repeated at intervals until the nose gradually attains normal size." (Andrews). If we destroy completely in one treatment, coagulation may be too deep, reach and destroy the cartilages giving a deplorably unæsthetic result. This accident may occur even if we proceed prudently at different periods. We believe that the high frequency current should not be used, because it is lengthy and uncertain in its cosmetic results. Nevertheless, we use electro-coagulation to obtain hæmostasis during the operation, as is noted later.

X-rays and radium are not of any use to reduce a rhinophyma. We would have to use such high doses as to cause severe radiodermatitis long before the nose would diminish in size. Some authors have noticed in rare instances a slight reduction in size in small rhinophymas after many irradiations. Radiotherapy should be confined to the treatment of folliculitis which follow sometimes decortication, "Acniform lesions will disappear and the sebaceous glands will become smaller and less active." (MacKee).

Finally we wish to draw attention to the beneficial effects of crossed linear scarifications after the operation when epithelialization is accomplished. It often happens that the skin is then unequal, granulated, and the nose shows here and there small nodules, due to the fact that the knife did not penetrate equally in all regions; it has a tomentous* aspect, scarifications plane the skin and make it uniform.

We present the short history and photographs of a patient treated by us for rhinophyma.

To decortication we have added electrocoagulation, to assure hæmostasis. As this newly formed tissue is highly vascularized, the hæmorrhage which accompanies the incision renders at times the operation very laborious. We have therefore applied prior to operation fine points of electrocoagulation to all the apparent veins.

* Tomentum, a kind of pubescence, composed of matted woolly hairs.

This manœuvre we repeated during the course of the operation as an artery or a vein would bleed. This allowed us to operate under very satisfactory conditions without being blinded by hæmorrhage.

We have been quite satisfied with the result of this modification of the usual technique of decortication.

CASE REPORT

M. M., 58 years, had suffered from rhinophyma for the last seven years. The onset was traced back to



FIG. 1.—Rhinophyma before treatment.



FIG. 2.—The same patient after decortication and scarification.

twelve years previous when the patient suffered from a rosacea which showed very soon incessant folliculitis. The nose gradually swelled to the size shown in Fig. 1. It descended to within one centimetre of the free border of the upper lip; its width was about thrice that of a medium-sized nose. The folliculitis, funnel-shaped pores, granulations, and large veins will be noted. The tumour was uniformly round and soft. The breathing was quite embarrassed.

Under general anaesthesia electrocoagulation and decortication were performed. Epithelialization was completed in three weeks, except at the terminal part where we excised too deeply. After repair the skin presented here and there a few irregularities which were reduced by

scarification. As some slight folliculitis seemed to appear we irradiated three times (2H at each sitting) in six weeks. The folliculitis disappeared and the skin became smooth.

Now (Fig. 2) the patient presents a slightly flattened nose, covered by a normal skin, except for a thin pellicle which re-covers the end on a surface the size of a ten-cent piece.

The flattening of the nose is no doubt due to the traction it suffered during all these years by the mass which was appended to it.

Case Reports

AN UNUSUAL CASE OF HEMIGIGANTISM

By MAX WISEBERG, M.D., C.M.,*

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This case came under my observation rather accidentally. The family physician, Dr. Rosenthal, informed me one day that he had a surprising case for diagnosis. He stated that the youngster was under his personal observation since birth, that many an eminent paediatrician has seen the child in private and at the Mount Sinai Hospital, N.Y., where it remained under observation for about six weeks, and at the Newark Beth Israel Hospital, Newark, N.J., where it remained from February 12, 1931, until March 16, 1931. At the time of the discharge no diagnosis was made.

The latter hospital kindly sent me a more or less complete record of their observation.

CASE REPORT

I. A., 22 months, a white female infant, of Jewish parentage, was admitted to the Norwalk Hospital on May 9, 1931. The mother, an intelligent but highly anxious young woman, made the following complaints; unequal growth on both sides since the age of 3 months, red and white blotches on the skin since birth, and inability to walk and talk.

History of previous illness.—The mother stated that the child's body, mostly the trunk and lower limbs, was covered with dark red areas which, as the child grew older, changed to dark brown in colour. These bronze-like patches had no definite uniform distribution; they were

of irregular size and brought out boldly into relief by the interposing white skin areas. The child had also webbed toes (first and second). At about the 3rd month she observed that the left half of the child's head, face, trunk plus the entire left lower and upper limbs, was very much bigger than the opposite side. Her attention was drawn to this early anomalous growth by the fact that the left ear was very much larger than the right one. She immediately consulted a paediatrician who informed her that there was "nothing to worry about the child until the age of 18 months." At this age the asymmetrical growth became so noticeably striking that she consulted many well-known specialists.

Personal history.—The child was born at full term. No instrumentation. Pregnancy was uneventful and the delivery was normal. The child was breast-fed for 2 months, then put on the usual infant diet as ordered by the family physician. Convulsions at the age of 5 months. No history of any other illness. The child supported the head firmly at about fifth month, but was not able to sit up until about twelfth month; able to stand with support at about eighteenth month but was never able to walk or to talk. She otherwise ate and slept well, and always looked healthy and playful.

The mother was born in Austria, the father, in Russia; married 8 years ago. There was no history of family intermarriage. Their first child, a boy who is 7 years old, was perfectly healthy and mentally bright. A history of one miscarriage.

Physical examination.—The child is a well developed, well nourished white youngster. She is able to sit up well, and supports herself while

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standing, but is not able to walk or talk. No earmarks of any idiocy present. She is playful, and very sensitive. The asymmetrical features of the head, face, etc., are very striking. The whole left side is markedly bigger and fatter, and the limbs are much longer.

The hair is dark brown in colour on the left half, whereas on the right side it is a shade lighter. There is definitely considerable bulging of the left fronto-parietal area. The fontanelles and the sutures are closed. The bulging is very striking in the forehead extending as far as the sagittal suture. The forehead is fairly prominent; no bosses present. The left ear is huge



FIG. 1

(corresponding to the size of ears often depicted in the pictures of 'wise' men of Buddhism); right ear comparatively normal. The hearing is good in both ears. The left side of the face is very much larger than the right. The left cheek is pendulous and expressionless. When she cries or smiles, there is hardly any expression on the left side, though there is no evidence of any paralysis.

The left eye is likewise larger than the right one. The pupils are unequal but regular. Reaction to light is prompt. The nose is asym-

metrical. It is curved to the right on account of overgrowth of the left side.

The upper and lower teeth on the left side are almost giant-like; the right ones are small. No decay is present. The left half of the tongue is bigger and longer, and is freely movable. The palate is highly arched and narrow, otherwise mouth and pharynx are negative. The glandular system is essentially negative.

The chest is funnel-shaped, costal borders flaring. The left side is apparently larger than the right. There is moderate right-sided scoliosis. No beading of the ribs is present. The examination of the lungs is essentially negative.

Cardio-vascular system.—There is a peculiar Medusa-like arrangement of venous channels in the right groin. The blood vessels are tapering off in all directions, one of which, particularly, about the size of an ordinary lead pencil and



FIG. 2

about 4 to 6 inches long, runs obliquely from the mid-point of this star-shaped arrangement across the antero-lateral aspect of the right thigh. On the anterior abdominal wall these veins are very prominent, and become more so whenever the child cries or makes an effort to sit up. Otherwise there is no other outstanding feature in the cardio-vascular system. On fluoroscopic examination nothing abnormal was discovered.

Abdomen.—The asymmetry here is most striking due largely to the very fat and pendulous anterior abdominal wall on the left side. There is apparent diastasis of the recti. No masses are seen or felt. The genitalia on the left side are markedly hypertrophied (see photograph).

Extremities.—There is fair muscular power in all limbs. *No paralysis seen anywhere.*

The left arm is hugely overdeveloped, considerably fat, particularly in the forearm, comparatively thin in the arm, the whole limb being longer than the right one.

The best conception of the lower extremities can be got by a study of the photographs. The left thigh is about twice as thick as the right one; the same in the legs and feet. The left lower limb is much longer than the right. There is marked hyperextensibility and hyperflexibility in all the joints of both lower limbs.

The skin is peculiarly mottled and bronze-like in colour. It is thin, elastic all over, silky-like on the right side, dry and somewhat scaly on the left side. One highly interesting feature is the fact that the child sweats on the right side, and is dry on the left side at the same time. Another most peculiar feature is the child's highly unstable temperature. During excitement and crying it rose to as high as 104° F., and dropped to normal within the first ½ hour.

Laboratory findings.—The urine was negative. The blood showed no change in cellular content. Nose and throat cultures were negative. Blood Wassermann and tubercle tests not reported.

DISCUSSION

Reference to older medical literature and text-books shows no trace of such a case as this. It is, I venture to say, the first case ever recorded of such an anomalous complete unilateral overgrowth of one side. Evidently the interest lies in the explanation of such a peculiarity. Some call it hemiatrophy; others, hemihypertrophy or hemigigantism. No definite diagnosis was made by anyone. It was maintained by some that the over- or under-development on one-half side of the body was caused by some disturbance of the pituitary gland. This theory, I am afraid, has hardly any physiological basis. Another theory was put forward by a neurologist. He claimed that the whole thing is largely due to a vasomotor instability in the body, *i.e.*, one-half of the body receives more blood supply than the other. Other casual observers remarked that it might be due to an embryological arrest of one-half of the body. Some one remarked that this may be one of the many freaks of nature. Another proposition put forward is that there may be some family retrogression, as

evidenced by the webbing of the toes, retardation in the mental faculties, etc. Lack of space forbids speculation as to exact cause of nature. However, it would be interesting to watch the further growth and the mental development of the child to see if any endocrine dyscrasias, abnormal nervous manifestation, or any atavistic stigmata would predominate in its development.

A CASE OF PSEUDOHERMAPHRODITISM

BY PRESLEY A. McLEOD, M.D.,

Kingston, Ont.

This case was first seen in April, 1929. The patient was aged 38 years, dressed as a female, Canadian, born in Ontario and had been married one year. Her reason for consulting a doctor was that her husband could not penetrate during coitus. She knew that she was abnormal, but apparently did not recognize her condition. She stated that libido was present and that both she and her husband experienced orgasm. She had never menstruated.

The general appearance when in street clothes was not strikingly unusual, but physical examination revealed characteristics more masculine than feminine. The general build was masculine, the face swarthy, the neck thick, the voice low and husky and the mammary glands masculine in type, but the pubic hair not indicative of either sex. She did have the masculine type of baldness.

A clitoris about an inch and a half long and almost an inch thick protruded from the folds of the labia. The labia majora were very thick and enclosed a funnel-shaped space about one inch deep, the inner end of which contained two small openings. These openings were the same size, slightly smaller than the cross section of a lead pencil. The upper opening proved upon catheterization to be the urethra. An attempt at a bimanual examination was unsatisfactory; nothing could be defined. Rectal examination was equally unsatisfactory. It was impossible

to feel a uterus, nor could a prostate be determined. Endeavouring to find out something about the lower opening, a can of lipiodol was injected through a catheter. While this was being done, a clamped catheter was *in situ* in the urethra. The x-ray pictures which were then taken showed a small canal of about the same diameter as the opening, leading to a cavity about the size of a small orange.

Inasmuch as the patient was married a plastic operation was performed to relieve her complaint. The opening was dilated and the mucous membrane stripped back on each side, working towards the cavity as far as possible. The tract was then incised longitudinally, including in the incision some fibres of the levator ani. It was impossible to suture the cut the opposite way as the mucous membrane was far too scanty. The opening was now large enough to admit two fingers, and, as no Sim's vaginal plugs were available, a large rubber tube, wrapped in several layers of iodoform gauze well smeared with vaseline, was inserted. This was done with the idea of keeping the tract well dilated while it was granulating and at the same time to help lessen the chance of infection. A self-retaining catheter was inserted.

The wound granulated well, the tube loosened spontaneously and came away readily on the fifth day. Convalescence was uneventful for the patient, but disturbing to the rest of the female ward, as the patient shaved herself each morning, much to the consternation of both patients and nurses.

Six months later a letter was received from her stating that the operation had proved a complete success.

In March, 1931, she again presented herself and wished for various reasons to have the greatly enlarged clitoris removed. This was done. The frenulum and prepuce were stripped back, the clitoris amputated, the redundant tissue resected and a very small rubber drain inserted which was removed at the end of twenty-four hours. The wound healed rapidly and was entirely healed when the sutures were removed. The only feature of the operation was the extreme toughness of the clitoris. It was with great difficulty that a sharp cervix needle could be pushed through its substance when ligating a blood vessel.

A PROBABLE CASE OF AORTIC THROMBOSIS

By A. F. MCKENZIE,
Monkton, Ont.

T.B., a farmer, first consulted me in November, 1927. At that time he was 40 years of age and the father of six healthy children. He complained of paroxysmal attacks of pain on the left side of his head, but apart from this his health was good. A diagnosis of neuralgia was made.

He again consulted me in December, 1928, complaining of being weak and irritable and unable to do a full day's work. Several teeth had been removed, but pains in his head, mostly at the vertex, continued. Since having his teeth extracted he had found it necessary to get up at night to urinate. This time a more thorough physical examination was made and the following points were noted. His arteries were rather hard; no cardiac murmurs, blood pressure 200/135; urine 1012, acid; considerable albumin and numerous hyaline and granular casts. During the following year he consulted me a few times and hypertension was present on each examination.

In December, 1929, he consulted me on account of inability to micturate. There was distension of the bladder, which could be palpated above the pubes and a moderately enlarged prostate. The patient was advised to go home and take a warm sitz bath. This gave him relief and he had no further trouble in this way. He last consulted me in my office in August, 1930, when his blood pressure was 255/160.

On April 30, 1931, I was called to see him at his home for a severe attack of pain in the cardiac region. He was pale and perspiring. His pulse was regular; blood pressure 240/140. No cardiac murmur could be detected. Albumin was present in the urine. A hypodermic of morphine and atropine was given. Twelve days prior to this he had had a similar attack, coming on after exposure to cold, when another practitioner was called in and gave him a hypodermic injection. Between these two severe attacks he had more or less constant pain in the cardiac region, but not enough to require an analgesic.

On May 1st the patient felt fairly comfort-

able, pulse 76; respirations 19; temperature 98.6; blood pressure 220/160.

I was again called to see him on May 3rd, and reached his home about 11 p.m. As soon as I got inside the house he called out to me to hurry and give him something to relieve his pain. He was lying in bed apparently suffering great agony. The pain, this time, was located about the centre of the abdomen. There appeared to be slight rigidity on the right side. There was tenderness to the left of the umbilicus. He was restless and changed his position by grasping the top of the bed with his hands. Both lower extremities were extended and paralyzed as to motion and sensation. The anaesthesia extended to about an inch below the umbilicus. No pulsation could be detected in either femoral artery. The blood pressure was 230/135.

After the patient had obtained some relief from an injection of morphia he told me that late in the afternoon he began to have some additional pain in the cardiac area but this did not get very bad until about 10 p.m. when the pain moved down to the abdomen.

He was again seen on May 4th, at 10.30 a.m. He had rested fairly well during the night. He said he had not much pain, but wanted to know if something could not be given to relieve his shortness of breath. Pulse 140; respirations 40; blood pressure 90/75.

Intestinal peristalsis was present and there was an involuntary liquid movement while I was examining him. No urine had been voided since the onset of the abdominal pain, and as no distension of the bladder could be detected little or no urine could have been secreted. The area of anaesthesia had extended a couple of inches. The legs were cold and becoming mottled. Death occurred about 1.30 p.m., 2 years and 5 months from the time the nephritis was diagnosed, 16 days after the first attack of cardiac pain, and about 16 hours after the onset of the abdominal pain. Up to within sixteen days of his death the patient did a moderate amount of work. No post-mortem was held. Although no Wassermann test was made in this case, syphilis can probably be excluded by the fact that his children were all healthy and his wife had no miscarriages.

Occlusion of the abdominal aorta by thrombosis or embolism is probably not a very common

occurrence. This case differs perhaps from most of those reported, in the preceding history of nephritis and hypertension, and the absence, so far as noted, of any valvular cardiac disease. So far as the location and shifting of the pain can be taken as a guide, it would seem as if a thrombus had first formed in the thoracic aorta and only partially blocked it and then shifted to the abdominal aorta and caused a complete block.

NOTE.—Without the assistance of a post-mortem examination it is, of course, impossible to make a certain diagnosis, though embolism, or embolism plus thrombosis, seem the most probable conditions. In view of the severe pain in the cardiac region four days before death, may the original condition not have been coronary thrombosis, with the formation of a clot on the wall of the left ventricle? This clot might have broken away and caused an embolus in the aorta. We have, also, ourselves, seen one case in which paralysis of and loss of sensation in the lower extremities occurred in which the cause was found to be an aneurysm of the aorta, partly thoracic and partly abdominal. The inner wall of this had become torn and a flap of tissue had acted like a valve, occluding the lumen of the aorta completely. [Ed.]

A SPORADIC CASE OF POLIOMYELITIS

BY SAMUEL MIRSKY, M.D.,

Ottawa

During the epidemic of poliomyelitis in Ottawa, in 1929, we had occasion to see many cases of poliomyelitis. Because of the presence of an epidemic, any child or young adult who presented the symptoms of headache and fever, in the absence of physical signs, was subjected to a diagnostic lumbar puncture and any spinal fluid count above 10 cells was an indication for treatment with serum. The routine of this procedure, no doubt, helped to prevent the development of paralysis in a great many cases, but in the absence of an epidemic such measures are not justifiable unless there is some associated evidence of meningeal irritation.

As a result of freedom from paralysis in the vast majority of our cases during the epidemic, there was often left a doubt in our minds as to whether the diagnosis was always correct, and I often wondered whether the symptoms and clinical signs of this disease were sufficiently plain to enable one to make a diagnosis in a sporadic case. Such a case did present itself recently.

The story as given by the child was as

follows. G. O., a girl of 11 years, returned to Ottawa after a six weeks' visit to Montréal, on August 9th. The following day, August 10th, she was in perfect health until sometime after breakfast, when she developed a frontal headache. She did not eat her lunch or supper. There was no other complaint. She walked into the office at 9 p.m., about ten hours after the onset of the initial symptom.

Physical examination.—A well developed, dark complexioned, little girl of 11, who appeared quite ill. Her temperature was 101.8°; pulse 136; respiration 22. The face was flushed with a suggestion of cyanosis. The physical examination was essentially negative, but tremors of the hands in the course of the examination were readily noticeable. On bending the head forward so that the chin would touch the chest, she complained of pain in the back, and on bending the back so that the head was between her knees there was pain in the back. Neurological examination was negative throughout, except for the tremors already mentioned.

A diagnosis of poliomyelitis was made. The child was taken to the Strathecona Hospital for lumbar puncture and faintly opalescent spinal fluid was removed, which showed 129 cells per c.mm. (mostly mononuclears). Thirty c.c. of poliomyelitis serum were given intramuscularly. The next morning, August 11th, her tempera-

ture was 102°; pulse 140. The child looked quite sick, but was mentally bright. There was no evidence of paralysis. The reflexes were normal. That night the temperature persisted, the pulse remained rapid, but the "spine test", was less marked. The following morning, August 12th, 48 hours after the onset of the illness, paralysis of the extensors of the right leg was noted. The spinal fluid showed 123 cells: 30 c.c. more serum were given. The following day, August 13th, the temperature and tachycardia persisted, and the paralysis involved the extensors of the thigh, leg and dorsiflexors of the foot; 30 c.c. more of serum were given. On August 14th, the fever and pulse rate began to drop and the patient's condition since then has returned to normal, except for the marked paralysis of the extensors of the right lower extremity. Subsequent information received revealed the information that during the week of August 9th, she had had a headache, but that it was relieved with castor oil.

The case is of interest because of (1) the diagnosis of a sporadic case; (2) the brevity of the interval from the onset of symptoms to the onset of paralysis, 48 hours, (unless the case was of dromedary type with the first stage unnoticed); (3) the unfortunate inefficacy of poliomyelitis serum in this case in the pre-paralytic stage.

ADENOMA OF THE ISLANDS OF LANGERHANS WITH HYPOGLYCAEMIA: SUCCESSFUL OPERATIVE REMOVAL.—N. A. Womack, W. B. Gnagi, Jr., and Evarts A. Graham, report the case of a patient with hypoglycaemia seizures due to an adenoma of the islands of Langerhans. The tumour was removed with a complete relief from symptoms. The mechanism of the production of the apparent hyperinsulinæmia was obscure. Microscopic examination showed that while many of the cells were abnormal morphologically and some of the secretory antecedents were unusual in type, ordinary beta granules were plentiful. Furthermore, the clinical picture and the reaction of the patient to dextrose when administered were of the type encountered in the reaction of the body to an overdosage of insulin. Therefore, while it is possible that in such a case as this dysinsulinæmia is present, there is no proof that the product is not a normal secretory one. When one considers the excessive amount of insulin-producing tissue that exists in the body, the remarkable feature

is that hyperinsulinæmia is not more common. In several cases in which the cause of the phenomenon was not apparent, partial resection of the pancreas was done. The results on the whole have been unsatisfactory. The work of Allen on dogs has shown that in this animal roughly about nine tenths of the pancreas must be removed before there is a constant production of glycosuria. If the same relationship holds in man, such a procedure to be efficient would be technically very difficult. If such a tumour as the one described by the authors should occur in the head of the pancreas or in the substance of the body, it would be extremely difficult to discover at operation. For this reason they feel that such a picture of hypoglycaemia as they have described should not be considered idiopathic in origin until careful section of the pancreas is made at necropsy. At post-mortem examination such a growth is probably often missed unless special care is taken.—*J. Am. M. Ass.*, 1931, 97: 831.

Editorial

IDIOPATHIC HYPOCHROMIC ANÆMIA

THE attention of clinicians is called to two interesting papers appearing in a recent issue of the *American Journal of the Medical Sciences*, in which two series of cases of idiopathic anæmia are presented, all of them characterized by a severe and prolonged course, a condition of gastric acidity and their occurrence in women most frequently in their third or fourth decade of life. Although presenting many of the symptoms of so-called pernicious anæmia, they differ definitely in the fact that the blood picture shows a low colour-index and those affected react very imperfectly to liver therapy.

During the past two years a few papers have appeared both in America and Germany calling attention to cases of anæmia occurring in women which were associated with complete or almost complete gastric acidity and a low-colour index. No recent treatises on the blood make mention of an anæmia of this character; the papers have, therefore, a special interest.

In the first of these papers Dameschek,¹ of Boston, reports under the name of *primary hypochromic anæmia*, cases in which the symptomatology was that of a pernicious anæmia, but the blood examination showed the characteristics of a secondary anæmia. One of the cases, however, reported by him was that of a man aged 29 years, in whom the anæmia, regarded as of this type, ran a variable and recurrent course and the response to liver and iron therapy, successful at first, failed towards the end. The six other cases were all women of between twenty and forty-five years. In his paper Dameschek discusses the relationship of this type of anæmia to the megaloblastic hyperchromic anæmia, commonly referred to as pernicious anæmia, and considers that some relation between the two possibly exists, and that in the cases he reports an imperfect maturation of the erythro- and normo-blasts had taken place owing to an inadequate digestion

of organic iron. The possibility of the cases described being instances of chlorosis is discussed and rejected, chiefly on account of the age of the patient, the existence of a sore or atrophied tongue and the almost constant absence of free hydrochloric acid in stomach contents.

Mills,² of Montreal, in the same number reports his second series of ten cases, all in women, characterized by the same symptoms, a severe chronic course, associated with a lowered hæmoglobin content in the blood, and, almost invariably, a complete absence of free hydrochloric acid from the gastric contents. In his paper he presents a clear picture of the disease which he also considers should be regarded as a definite clinical entity.

Although isolated cases of anæmia with undetermined etiology and a low colour-index in the blood have been reported for several years both in this country and in Germany, Mills states that it was not until 1929, in a paper written by Weiner and Kaznelson³, reporting several cases with similar symptoms, that an attempt was made to establish the disease as a distinct entity, under the term of *achylische Chloranæmie*. A more recent paper by Watkins⁴, describing similar cases, used the rather paradoxical title *idiopathic secondary anæmia*. Mills, in his paper, suggests the simpler term *idiopathic hypochromæmia*, and this term has been accepted by several recent writers. Very recently Mettier and Minot⁵ have referred to similar cases under the name of *chronic chlorosis*, but this term would appear to be inappropriate for the reasons we have stated above.

The disease is a comparatively rare one; only 10 cases out of a total of 6,863 new medical out-patients were recognized in this department of the Montreal General Hos-

1. Dameschek, *Am. J. M. Sc.*, 1931, **182**: 520.

2. Mills, *Am. J. M. Sc.*, 1931, **182**: 554.

3. Weiner and Kaznelson, *Klin. Wchnschr.*, 1929, **8**: 1071.

4. Watkins, *J. Am. M. Ass.*, 1929, **93**: 1365.

5. Mettier and Minot, *J. Am. M. Ass.*, 1930, **95**: 1089.

pital in 1930. All were females. Despite a diligent search of the literature, only one case among the male sex has, up to the present, been recorded. Fatigue, imperfect hygiene in living apartments, and defective food appear to play a minor rôle in its etiology. Pregnancy would appear to be a complication rather than an etiological factor. A marked reduction or complete absence of free hydrochloric acid in the gastric contents would appear to be the most important etiological agent. The onset of the disease is described by Mills as insidious. The majority of his patients sought aid for symptoms due chiefly to the anæmia itself, viz: a feeling of weakness, dyspnoea and gastric disorders, and all presented a waxy, bloodless, appearance. Examination revealed, as a rule, no evidence of parenchymatous disease. The spleen was rarely palpable, the blood picture was chiefly remarkable for the lowering of its hæmoglobin content; with only a slight lessening in the number of the erythrocytes and the platelets.

The erythrocytes were on an average slightly below normal in size; but variations in size and shape were not remarkable. No evidence was noted of any tendency to increased hæmolysis. The bilirubin content of the plasma was always within normal limits.

Mills, in his present paper, as well as in his previous one, emphasizes the therapeutic value of full doses of iron with the addition of small quantities of a copper salt; a therapy suggested by the experimental observation of Hart⁶ on milk anæmia in white rats, and Whipple⁷ on anæmia as met with in dogs. Adamson and Smith⁸ have also recently reported favourable results from this therapy in some cases reported under the term chronic chlorosis, but in which on examination a definite absence of hydrochloric acid in the gastric juice was reported.

A.D.B.

6. Hart, *J. Biol. Chem.*, 1928, **77**: 797.

7. Whipple, *J. Biol. Chem.*, 1928, **79**: 577.

8. Adamson and Smith, *Canad. M. Ass. J.*, 1931, **24**: 793.

AVIAN TUBERCLE BACILLUS INFECTION IN MAN AND ITS ASSOCIATION WITH HODGKIN'S DISEASE*

THE avian tubercle bacillus, which is usually the causative agent of tuberculosis in birds, is known to cause spontaneous tuberculosis in a number of mammals, notably cattle and swine. Of the laboratory animals the rabbit is the most readily infected experimentally. Man on the other hand is usually considered immune, though there are to be found in the literature some score of human cases reported as infection with the avian tubercle bacillus. Löwenstein, of Vienna, who has reported four cases himself and confirmed the diagnosis in others, mentions his first case in 1905. He thinks however that the "typho-bacillose-Landouzy," a bacillæmia due to an acid-fast form, reported by this author in 1891, probably falls into this group. He is also willing to accept the fact that the natives in Egypt and the Philippines sleep with their poultry is a sufficient explanation of the

frequency of urogenital tuberculosis in these countries.

Löwenstein's clinical description of the human cases is that of a primary stage with sepsis, enlarged spleen, and a long-continued remittent fever, with evening elevation of temperature. Some patients apparently die in this stage and the disease is confused with typhoid fever. Localization is apt to occur in the bone marrow, kidney, skin, and sometimes in the lymph-nodes. One feature noted is the reaction to avian tuberculin with much smaller doses than with mammalian tuberculin. The kidney cases are the most common. These usually heal either spontaneously after removal of the kidney, or after treatment with avian tuberculin. Some of the characteristics are that the bladder does not become infected, the organisms occur in very large numbers, and are usually situated within polymorphonuclear leucocytes. In certain blood dyscrasias, *i.e.*, polycythæmia rubra and myelogenous leukaemia, this organism has been recovered.

* A review of this subject is to be found in the August issue of the *Archives of Pathology*, 1931, **12**: 253.

The skin lesions are described by Urbach under four different types:—(1) an aphthous septicæmic type, with bone and joint changes; (2) sarcoid lesions; (3) a gummatous form; and (4) local ulcers. These last are obviously instances of direct exogenous infection. The lesions in the lymph-nodes may be mistaken for Hodgkin's disease. Pathologically, the spleen is always enlarged and shows peculiar large infarcts. The bone-marrow, in the few cases examined, showed fibrosis, while the kidney lesions resembled abscesses rather than tubercles. In summarizing, Löwenstein lays stress on the enlargement of the spleen, which shows the presence of areas of non-specific necrosis, disseminated abscess-like foci in the kidneys, complete absence of caseation in the lesions, a purulent exudate in the pulmonary alveoli and the large number of intracellular acid-fast bacilli in the lesions. In view of the fact that the lesions of the avian tubercle bacillus in birds are somewhat characteristic, being composed of well isolated, encapsulated masses of cells, some cases have been reported in man in which the diagnosis was based on the pathological picture alone, but this does not seem justifiable at the present time. Unfortunately, in some of the reported cases the data given are somewhat meagre and the diagnosis of avian tubercle bacillus is not absolutely proved, for it must be remembered that cases are reported of infection of man with acid-fast organisms not tubercle bacilli. The latest report of such a finding is from Bayne-Jones; the organism was recovered from a purulent pleurisy in a child. It has been reported that there are strains of avian tubercle bacilli of much lower virulence than are the standard strains (Griffith), and it is only by painstaking study that such organisms can be recognized as really avian tubercle bacilli.

Granted however that there are authentic cases on record, there are many points of interest open for discussion. The first is the possibility of this organism being converted in its mammalian host into another type of tubercle bacillus. There is no proof at present that this occurs, Griffith having observed for many years a goat which secreted avian tubercle bacilli in its milk but without any change in type. There is also the question of the mode of infection.

Excluding two cases of skin ulcers which were obviously direct exogeneous infections, the portal of entry appears to be by ingestion. In countries where fowls are well cooked before eating there is little chance of infection occurring by eating poultry, so that there remains infected eggs or milk. A large number of tuberculous fowls do not lay eggs, and of those that do only a small percentage contain living bacilli. Experimentally infected fowls have also been shown to lay eggs harbouring tubercle bacilli, and eggs infected experimentally have been shown after "soft boiling" still to contain living bacilli. On the whole, however, the chances of infection are slight. Practically nothing is known of the presence of avian tubercle bacilli in milk. Finally, there remains the question of the specificity of avian tuberculin. This is one of the factors stressed by some authors in the diagnosis of their cases, and there is well substantiated evidence that cows infected with avian tubercle bacilli react more strongly to avian tuberculin. This fact is of considerable practical importance, and in Denmark some owners have saved their animals from being slaughtered by insisting on tests being done with both avian and mammalian tuberculins. If the reaction is stronger to the former the animals are isolated from poultry and the test repeated in six months, when it is found that a great many cease to react.

There remains for consideration only the observation of L'Esperance, of New York, that she isolated avian tubercle bacilli from four cases of Hodgkin's disease. In the first three cases no acid-fast bacilli were found in the lesions, and they were only isolated from fowls after inoculation with human material. As she did not do a tuberculin test on the fowls before the inoculation, and as the animals were kept in open cages on the soil, the findings are open to criticism. In the fourth case an acid-fast organism was isolated by direct culture and by inoculation of rabbits. The organism culturally resembled avian tubercle bacilli and was pathogenic for fowls but not for guinea pigs. The description of the case, however, was not absolutely characteristic of Hodgkin's disease, and L'Esperance herself described it as Pel-Epstein's syndrome, merely using it as additional evidence for her three former

findings with typical Hodgkin's lymph-nodes. Until her work is corroborated one would seem justified in stating that the case for the

avian tubercle bacillus being the cause of Hodgkin's disease is not proved.

ARNOLD BRANCH

THALLIUM AND ITS DANGERS

THALLIUM acetate is a substance that has come into prominence of late years on account of certain remarkable properties that it possesses. Chief of these is its power, when ingested or applied to the skin, to remove hair. This particular action is manifested chiefly on the scalp, and, accordingly, the drug has a considerable vogue with dermatologists who have found it useful as a depilatory in the treatment of ringworm and favus of that region. As might be expected, a drug with such specific powers speedily attracted the attention of the commercially-minded and it appeared on the open market in the form of depilatory creams, which have a ready sale, and have been extensively advertised in popular magazines in the United States, and also have been pushed to some extent in Canadian journals. Fairly numerous articles, of a scientific character, have appeared from time to time in the medical press, two of them in our own *Journal*.^{1,2} Attention has again been directed to the subject lately, owing to the fact that several cases of poisoning have been reported as following the use of the drug.

Thallium is slightly more toxic than arsenic and is readily absorbed by the body, even when applied to the skin. It is, moreover, cumulative in its effects. Its depilatory action is not a local one on the hair follicles, but, as shown by the late Prof. W. E. Dixon,³ is specifically on the autonomic nervous system, facilitating the passage of stimuli through it. The action of thallium in causing alopecia is, indeed, unique in pharmacology, and is shared by no other metal. A single dose, of proper amount, is employed. This is an important point. Too large a single dose is dangerous, and the repeated administration of small doses over a period of time, as by the application of depilatory creams containing the

drug, would, one would infer, be also dangerous, for the drug is readily absorbed from the skin and the dosage cannot be properly regulated.

Cooper and Engman⁴ give the depilation dose of thallium in human beings as 0.008 grams per kilogram of body weight, and state that the use of the drug is limited because of its high toxicity and also because it can be used with safety only in children below the age of puberty. It should be mentioned, also, that there is some experimental evidence to the effect that smaller doses of thallium may have an effect contrary to that expected. Cooper and Engman (*loc. cit.*) found that single doses of 0.004 and 0.006 of thallium acetate per kilogram of body weight, dissolved in water and injected into white rats intraperitoneally, produced a stimulation of the growth of the hair to the extent of eighteen per cent. It is clear then, if these results be accepted, that when the depilatory action of the drug is desired the dosage lies within quite narrow limits. Hence, the necessity for knowledge and care.

In large doses thallium salts cause stomatitis and diarrhoea, with stimulation of the heart's action followed by depression. Diuresis and albuminuria have also been observed occasionally. Dr. John Lansbury, of the Mayo Clinic, has recorded the following striking case.⁵

A woman, aged thirty-eight, complained of severe abdominal pain with some changes in the skin. There was a slight papulomacular eruption, and the skin of her legs was warm and scaly, and so rough as to suggest ichthyosis. On the feet were dry calluses which were beginning to peel. The hair was loose and could easily be pulled out. Five days later the patient had become almost bald, except for a thin fringe round the

1. Bedford, *Canad. M. Ass. J.*, 1928, 19: 660.

2. Ormerod, *Ibid.*, 1928, 19: 663.

3. Dixon, *Proc. Roy. Soc. of Med.*, 1927, 20: 8.

4. Cooper and Engman, *Arch. Dermatol. & Syphilol.*, 1931, 23: 1031.

5. Lansbury, *Proc. Staff Meet. Mayo Clinic*, Nov. 12, 1930.

margin of her scalp. The body hair also fell out to some extent, but not that of the eyebrows and eyelashes. It was found that the patient had been using a depilatory cream for five weeks, which, on analysis, was found to contain a high percentage of thallium. No lead was present, which was noteworthy considering the severe colic from which the patient had suffered. Later, the skin returned to normal and the hair to grow in again. Another similar case, due also to the use of a depilatory cream, is recorded by Ramond.

It is evident from this that the use of thallium is fraught with danger, when in the hands of those unfamiliar with it or inexpert. It is not a drug to be used by the lay public. The margin between the toxic dose and the depilatory one is very small. In this connection it may be stated that the Board of Education in England has prohibited the use of thallium in the treatment of ringworm in school children. With regard to depilatory creams, one of them, widely advertised, contained, at one time, as much as seven per cent of thallium acetate. We are informed that the amount has now been reduced to three per cent. Even this, according to Sabouraud, is dangerous, and the *British Medical Journal*⁶ is of opinion that the use of thallium in depilatory creams should be strictly forbidden. In short, if a depilatory

cream containing thallium, is effective for its purpose, it is dangerous; if it is not effective (from containing too small an amount of thallium) it is a fake. Incidentally, it may be noted that ten dollars has been asked for a jar of depilatory cream, the ingredients of which are worth about thirty-five cents. Physicians should be aware of these facts, and use their influence to check the use of these dangerous preparations, and, if possible, prevent their sale. In the present state of the law this seems to be impossible just now. We are informed on reliable authority that the attention of the Department of Pensions and National Health at Ottawa has been directed to this matter. The Chief Dominion Analyst states that "preparations of this kind are not properly regarded as medicinal in character and so do not come within the definition of 'drug' as the term is employed in the Food and Drugs Act;" also, that "there are numerous cosmetics and beautification devices that are more or less objectionable, but hitherto have not been shown to be of sufficient importance to warrant special legislation to deal with them." This situation is far from satisfactory. As our informant puts it—"If there is nothing in the Food and Drugs Act to prevent a dangerous poison—even when applied externally only—from being sold in the open market for unrestricted use, then it is time that the Act was amended or new legislation enacted."

A.G.N.

6. *Brit. M. J.*, 1931, 1: 320.

Editorial Comments

Michael Faraday

During the closing days of September last the centennial of Michael Faraday's discovery of induced electricity, one of the most momentous events in human history, was appropriately observed in London. An important feature of the celebration was the Faraday exhibit which was opened by General Smuts just before his induction as president of the British Association for the Advancement of Science. Faraday's discovery was momentous because from it arose the dynamo and many other practical applications of electricity to the purposes and welfare of man. Even yet we have not plumbed the depths of its potentialities.

Michael Faraday's career reads like a fairy tale. Born in 1791, he was a poor boy, with

few advantages, and largely self-taught. He was apprenticed to a bookbinder and occupied his leisure with scientific experiments. On one occasion, when twenty-one years of age, he was taken by a friend to hear a lecture by Sir Humphry Davy. He was so struck with what he heard that he determined to follow science. He followed the full course provided and took careful notes. He had his notes bound and sent them to Sir Humphry with the statement that he would like to take up scientific pursuits. Sir Humphry was impressed and Faraday got his chance; he was made bottle-washer in the laboratories of the Royal Institution. Twelve years later he was the Director of the same establishment!

In 1829, Faraday became lecturer at the Royal Military Academy at Woolwich and in

1833 was appointed to the newly created chair of chemistry at the Royal Institution. There it was that he made his most important discoveries. Chief among these were the liquefaction of gases (1823), the magnetic properties of the different gases, electro-magnetic induction (1831), electrolytic dissociation (1833), and electric deflection of light (1845).

It had been proved more than a hundred years ago by Oerstead that an electric current had power to divert a magnetic needle suspended freely in its neighbourhood; Ampère had demonstrated a dynamic action between conductors carrying electric currents; and Arago and Davy had discovered that the electric current had power to magnetize iron and steel. There was, therefore, abundant evidence that electric currents could produce magnetic effects. Was the converse true—that magnetism could be converted into electricity? It seemed probable. Faraday undertook this investigation and after four years' painstaking work came upon the demonstration. He wound two coils of wire on to opposite sides of a soft iron ring. One of these he attached to an electric battery and the other to a galvanometer. When he "made" or "broke" the current passing through the one coil the galvanometer attached to the other manifested corresponding oscillations. Yes, magnetism could produce electricity. This crucial experiment was performed on August 29, 1831, when Faraday was assistant to Sir Humphry Davy at the Royal Institution.

Faraday's discoveries touch very closely on medical practice, as they have proved to be of particular value in diagnosis and of much efficacy in treatment. The x-ray and the electrocardiograph are both based on induced electricity; ionization, the conception of which we owe largely to Faraday, is used in treatment, and we are still exploring the applications of the electric current (Faradism). But Faraday was more than a physicist and chemist. He was a psychologist and philosopher, as we shall see immediately. His mental horizon was indeed wide.

Some thirty years ago, in the year 1900 to be precise, D. F. Fraser-Harris, formerly Professor of Physiology at Dalhousie University, enunciated at a meeting of the British Medical Association the principle of "functional inertia." Something like this had been suggested by Weigert previously, though not in such a definite way. To use Fraser-Harris's own words,¹ functional or protoplasmic inertia is "that property of living matter in virtue of which it tends to maintain the metabolic *status quo ante*, even although it may have received a stimulus to change that state. Thus the 'latent period' of

muscle, gland, or nerve-cell is the time-expression of the functional inertia of rest; functional or protoplasmic momentum is that property of living matter in virtue of which the protoplasm, having responded to a stimulus, continues to exhibit its activity (or inactivity, if that was the *status quo ante*) after the stimulus has ceased to exist. Thus periods of post-stimulant activity, or 'after-discharges', are time-expressions of functional momentum." He illustrates the idea in this way—"A striking example of functional inertia in both its phases is afforded by the behaviour of the beating heart when subjected to an inhibitory stimulus through the vagus nerve. If one is recording the contractions of the heart, and marks the moment of arrival of the stimulus, it is seen that the heart makes one or two beats before it stops. Now, on cutting off the stimulus, it is found that the heart does not at once resume beating but only after a period of inactivity (post-stimulant inhibition). The beats given before it stopped are an expression of its 'functional inertia' proper; its remaining quiescent after the inhibitory stimulus was withdrawn is the expression of its functional momentum. It is interesting to note that functional momentum is in this case expressed by inactivity, because inactivity (inhibition) was the *status quo ante*." On this principle of functional inertia Ehrlich, basing himself on Weigert, developed his "side-chain" theory, and Adami, basing himself on Fraser-Harris, developed his theory of "the habit of growth," which, he held, was one of the forces at work in tumour formation.

Fraser-Harris does us the further service of pointing out (*loc. cit.*) that, when only twenty-seven years old, Faraday enunciated the principle of "mental inertia." This was in a paper read in 1818 before the now defunct City Philosophical Society, entitled "Observations on the Inertia of the Mind." Mental inertia was that property of the mind which leads it to resist change on the one hand and to persist in its *status quo ante* on the other. This principle, Faraday held, was the basis of habit. Let us quote him here. "There is a power in natural philosophy of an influence universal and yet withal so obscure in its nature, so unobtrusive, that for many years no idea of it existed. It is called 'inertia'. It tends to retain everybody in its present state and seems like the spirit of constancy impressed upon matter. Whatever is in motion is by it retained in motion, and whatever is at rest remains at rest under its sway. It opposes every *new* influence and strengthens every *old* one. Is there anything in the human mind which seems analogous to this power? Is there no spiritual effect comparable to this corporeal one? What are old habits? Old prejudices? They seem something like a retention in a certain state due to something more

1. Fraser-Harris, *Discovery*, 1931, 12: 311.

than the active impulses of the moment. . . . Inertia is an essential property of matter; is it a never-failing attendant on the mind?" This conception of mental inertia, as Fraser-Harris shows, has been stabilized and extended since Faraday's time. It is based on functional inertia, "the fundamental and universal property exhibited by all living matter from the white blood corpuscle to the brain of man."

A leading article in a recent number of *The Lancet*² has this to say of Faraday. "As with all really great men, the secret of his success eludes analysis. He had that innate genius which can never be explained. Perhaps the nearest approach to describing the mainspring of his life is made by Lord Rutherford when he says that it was the underlying idea of the unity of all the forces in nature. Faraday was a splendid type of the Baconian philosopher, with the faculty of clear and convincing exposition of the most abstruse subjects. In character, he was simple, modest, and singularly unselfish."

Faraday was one of the profoundest thinkers of our race, and his memory should be one of our treasured possessions for all time.

A.G.N.

2. *The Lancet*, 1931, 2: 694.

Precipitin Tests with the Phosphatide Fraction of Tubercle Bacilli

It is well known that the National Tuberculosis Association of America, under the chairmanship of Dr. William Charles White, is carrying on extensive investigations on various chemical fractions isolated from tubercle bacilli. One of the lipid fractions, a phosphatide, prepared by Dr. R. J. Anderson, of Yale, has been shown to have the property of calling forth typical epithelioid cells for the formation of the tubercle and is also antigenic when injected in rabbits.¹ This latter property has been made use of by Doan² for diagnosing tuberculosis early in such conditions as meningitis or in pleural effusions where bacilli are difficult to demonstrate. Actually, he has found the test of practical importance.

In cases of tuberculous meningitis the earliest reaction is elicited by testing for phosphatide antigen in the spinal fluid using an anti-phosphatide rabbit serum. It is only later that antibody appears in the fluid, when a precipitin test may be obtained using the phosphatide as antigen. Stewart and Doan³ have also applied the test to Hodgkin's disease and find that 26 of 32 cases of Hodgkin's disease studied showed a capacity of the blood serum to precipitate the tuberculo-phosphatide in a dilution of 1:640 or higher. On the other hand, only 3 of the 23 cases of other lymphadenopathies showed a similar titre and one of

these was tuberculous. These findings appear very suggestive to the authors, although they take a commendably conservative position. They point out for one thing the frequency with which tuberculosis and Hodgkin's disease are known to occur in the same individual. It would seem, however, that the phosphatide fraction of other acid-fast bacilli than the three types of tubercle bacilli should be tested, as it may prove that this fraction is common to all acid-fast bacilli and not only the group of tubercle bacilli; in this case the significance of the test would be less specific.

It will not be long before the pure crystalline tubercle-protein will be obtainable for skin tests instead of the various tuberculins at present in use, and it is sure to be at no distant date that one will be able to procure the phosphatide fraction for precipitin tests.

ARNOLD BRANCH

1. Sabin, Doan and Forkner, *Trans. Nat. Tuberc. Ass.*, 1928, 24: 253.

2. Doan, *Proc. Soc. Exp. Biol. & Med.*, 1929, 26: 672.

3. Stewart and Doan, *Ann. Surg.*, 1931, 93: 141.

Mortality Rates in Canada and the United States

The death rate amongst Canadian wage-earners and their dependents is found by the Metropolitan Life Insurance Company to be about 9 per cent higher than for the corresponding group of individuals in the United States, for the period 1925 to 1930.* It is stated that this is entirely due to the high death rates in the Province of Quebec, New Brunswick and Nova Scotia, more especially Quebec, a disconcerting situation which is only to some extent relieved by the fact that there is also a definite trend downwards in the mortality rate of most of the preventable diseases. In 1930, typhoid fever, scarlatina, diphtheria, influenza, pulmonary tuberculosis and puerperal conditions, all showed the lowest mortality on record amongst Canadian policyholders, although it has to be admitted that the improvement in Canada in diphtheria and tuberculosis was by no means as great as in the United States. Other important diseases, such as cancer and diabetes, which of course are not yet susceptible of control, show no appreciable differences of mortality in the two countries.

When we turn from death rates dependent only on disease—preventable or otherwise—to those due to violent causes, we are shown an even more striking contrast, but this time in favour of the Canadian group. Suicides account for a much higher death rate among American wage-earners, although Canada's rate in this respect shows a fairly sharp rise

* Statistical Bulletin No. 6, June, 1931.

for 1930. Accidental deaths also exact a lower toll amongst Canadian wage-earners, particularly as regards automobile accidents, which, however, have increased steadily in Canada, except in 1930, when there was a decided reduction.

In no respect, however, do these statistical comparisons bring out a more startling difference than in the case of homicidal deaths. In Canada, the death rate from homicide ran from a low point of 0.2 per 100,000 insured lives to a maximum of 0.8, in the six-year period 1925-1930. For the same period in the United States this rate ran from a minimum of 7.0 to a maximum of 7.7; even if allowance be made for the very high homicide rate amongst the 21 $\frac{1}{4}$ million insured negroes, the rate amongst the white lives is still about six times greater than it is in Canada.

This, of course, is a matter of social significance, whose explanation, it is suggested by the Bulletin, lies partly in the fact that in Canada there is a "more prompt and certain disposition of the cases who give way to the homicidal impulse." That is possibly so, and to that extent it is gratifying. But let us not leave undone those things in preventive medicine which after all are just as necessary for the self-respect of a civilized nation.

H.E.M.

Acta Brevia Neerlandica

We are in receipt of volume 1, number 1, of a new Journal, *Acta Brevia Neerlandica de Physiologia, Pharmacologia, Microbiologia E. A.*, edited by E. Lanqueur, Amsterdam, A. K. M. Noyons, Utrecht, and L. K. Wolff, Utrecht. It is published monthly by Swets and Zeitlinger, 471 Keizersgracht, Amsterdam, Holland, and is sent post-free to foreign countries for 6.25 guilders (\$2.60), on application to the publishers.

This Journal will be devoted exclusively to short articles of one to two pages, which may be written in one or other of the three world-languages, English, French and German, and is intended to bridge a gap that is felt in Holland to exist between the long article of the ordinary journal and the brief abstract. The main idea behind the production of this new journal is that the work of Dutch scientists, which at present is apt to be lost completely, so far as the outside world is concerned, will become more generally known.

Its nature may be inferred from the fact that the various papers emanate from the histological, pathologico-anatomical, hygiene, and

pharmacological departments of the Universities of Utrecht, Groningen and Amsterdam and from the Department of Tropical Hygiene of the Royal Colonial Institute of Amsterdam.

This journal will serve a useful purpose if it introduces Dutch research to the many who do not read Dutch and will be welcomed by workers everywhere.

A.G.N.

A Productive Clinic

We publish in this issue the description of a case of lipæmia retinalis by Drs. S. H. McKee and I. M. Rabinowitch of the Montreal General Hospital. The condition is rare, this case being only the forty-second on record in the literature, and the first to be reported from what is the largest diabetic clinic in Canada.

Attention is drawn to this partly because of the intrinsic interest of the case, but partly also because it happens to be the occasion for the 100th publication from the Department of Metabolism at the Montreal General Hospital. This record of work, much of it original, is one to be proud of, and we are glad to be able to say that many of these publications have appeared in our pages. Some were found to be too technical for our requirements and they appeared, therefore, in English or American special journals.

H.E.M.

Honour to Dr. W. Harvey Smith

The *Journal*, in common with the numerous friends of Dr. Harvey Smith in all parts of Canada, rejoices in the further honour that has come to him lately. At the quinquennial celebration held by McGill University in October Doctor Smith was accorded the honorary degree of Doctor of Laws, as being one of the University's distinguished graduates. It will be remembered that, on the occasion of the meeting of the British Medical Association in Winnipeg last year, he received the same recognition from the University of Manitoba, where he was Professor of Ophthalmology. Doctor Smith had at that time the unprecedented distinction of being president of both the British and Canadian Medical Associations and his efforts to promote the success of the joint meeting held in Winnipeg and his wonderful bonhomie will not soon be forgotten. The event will remain ever memorable. Of Doctor Smith we may say, as said the ancient Romans of their notable men — "He has deserved well of his country."

A.G.N.

Men and Books

PEWTER OF MEDICAL INTEREST*

By T. G. H. DRAKE, M.B.

Toronto

Pewter is an alloy of tin with copper, antimony or lead in various proportions. Good pewter contains about 80 per cent of tin and is quite similar in composition to modern solder. Pewter utensils were made by casting, by hammering a flat plate of the metal, by fashioning on a lathe, or by a combination of these methods. Pewter utensils dating from the Roman period have been found in England, but are of such rarity that they are unobtainable by the private collector. The use of this metal persisted until the discovery of Britannia metal in the early part of the nineteenth century. Britannia metal is an alloy of tin with antimony, plus copper or zinc. This material can be more easily fashioned on the lathe and the discovery that it could be electroplated spelled the doom of pewter.

Various marks are frequently found on pewter but the absence of a mark does not mean that the article is a modern copy, or that the article is not made from good metal. From the early part of the fifteenth century until the end of the eighteenth the making of pewter was under the control of the Pewterers' Guild. This Guild which was very powerful in the early part of its existence specified the marks which could be placed upon pewter. An X, with or without a crown, could be placed on articles made from metal of extra good quality. The rose and crown, with the addition of "London," could be stamped on high quality material. The individual maker's trade mark is known as a touch mark. This consisted of a design, frequently heraldic, with or without the maker's name. The members of the Guild were required to stamp their touch marks on the lead plates, which are even yet preserved. From these touch marks the approximate age of any article bearing them can be determined. Some articles bear a series of small marks in simulation of the hall-marks on sterling silver. Possibly

these were used, though frowned upon by the Guild, to persuade the purchaser that he was obtaining a superior article.

On account of the low melting point of the metal no article to which direct heat is to be applied can be manufactured from pewter. In the accompanying illustrations are shown some articles in this metal of medical interest from the author's collection. All objects shown are of English manufacture. The three infant feeding flasks shown in Figure 1 are of eighteenth century manufacture. Their capacity is from 10 to 16 ounces. These were tipped with sponge-filled nipples made from cloth or chamois, the food being sucked through between the loose stitches. A tanned cow's teat was supposed to be especially attractive to the infant. Rubber nipples did not come into use until the middle of the nineteenth century. The fourth specimen is a croup kettle or inhaler. This bears the touch mark of Henry Joseph, dating the specimen from about 1743. On the top can be seen the spout to which



FIG. 1.—Eighteenth century infant feeding pots and an inhaler.



FIG. 2.—Seventeenth and eighteenth century bleeding bowls.

* From the Sub-department of Pædiatrics, University of Toronto, and the Hospital for Sick Children, Toronto.

the tube for inhaling can be fixed. The second opening which can be closed by the perforated brass window is for the introduction of the balsam. The handle is hollow, perforated at its upper part and opens into the inhaler at the base.

Three bleeding-bowls are shown in Figure 2. The left one dates from about 1650, the central is late eighteenth century and the specimen on the right is from the beginning of the nineteenth

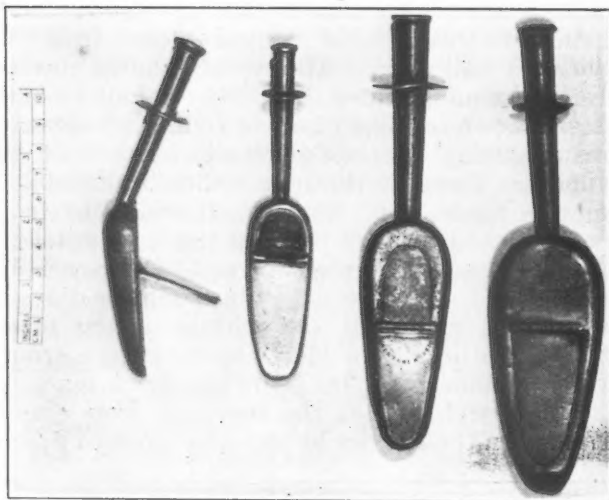


FIG. 3.—Medicine spoons.



FIG. 4.—Eighteenth century pap boats and a medicine measurer.



FIG. 5.—Eighteenth century feeding pot.

century. The last two are graduated by circular markings, the smaller in 2 ounce graduations to 14 ounces, and the right in 4 ounces to 24. Great care should be exercised in purchasing bleeding bowls, many modern copies made from the old moulds being on the market.

Figure 3 presents a series of medicine or castor oil spoons, dating from about the end of the eighteenth century. These have a capacity of from 1 to 6 drams. They were sold with a straight slit across the tip which could be enlarged by cutting away the soft metal with a knife. The spoons were filled through the trap door in the bowl. This tip was placed in the patient's mouth, the flow being controlled by the finger placed over the end of the hollow handle. If the contents were not taken as rapidly as desired one could blow down the hollow handle. It has been stated that the larger sizes were used for the feeding of thin paps.

Two pewter pap-boats *circa* 1780 are shown in Figure 4. One bears the X and crown mark. Pap was made by boiling cereals or bread with water and sugar, and was fed from the boat or spoon. The central specimen, a medicine measure, is marked $\frac{1}{2}$ ounce, 1 spoon on the smaller portion and 1 ounce on the upper.

Feeding pots of many types for use of the infant and adult are met with. The specimen shown in Figure 5 dates from about 1780, and its capacity is about 1 pint. A very interesting series of infants' feeding pots is illustrated in Still's History of Pædiatrics.

While eighteenth century pewter is quite common, in fact objects dating from this period being as cheap in England as is modern pewter, objects of medical interest are becoming increasingly difficult to obtain. All those shown were obtained by correspondence. The values of the objects illustrated are approximately as follows; feeding-bottles \$7.50 to \$10.00; croup-kettles \$7.50; bleeding-bowls from \$10.00 to \$25.00; medicine spoons \$4.00 to \$5.00; pap boats \$5.00 to \$6.00. I have been able to obtain most of the objects from one dealer who has a *carte blanche* order to buy for me anything of medical interest that turns up in the auction rooms. In this way I have obtained specimens at a reasonable price. Practically all English dealers will send articles on approval against suitable references. Some idea of values is necessary with some dealers, in witness of which I have just returned a Grecian feeding-pot in pottery sent on approval at \$25.00, having already obtained an exactly similar specimen for \$1.87.

Opinions differ as to whether pewter should be polished. Dealers usually leave it in the rough. The average collector's opinion is that there is no more reason for leaving pewter unpolished than there is for leaving silver uncleaned. As pewter is easily scratched, a high grade silver polish is the only one that should be used.

THE PRINCE OF BEGGARS

BY H. E. MACDERMOT,

Montreal

Some men have an inborn tendency to beg, which manifests itself through life in minor acquisitions, from cigarettes to five-dollar bills. In very few is it so specially developed as to be impressive; indeed, as George Eliot has remarked, man can never beg with that complete dignity with which dogs make their supplications. But in the late Lord Knutsford, Chairman of the London Hospital, begging was raised to a high artistic level. How else can one describe the work of a man who directly or indirectly begged over thirty million dollars for his hospitals.

It was not an occupation that called for any professional or specialized training. A sense of humour was necessary,—and one strong enough not to be overcome by the tragic and pathetic side of the work,—a wide knowledge of men, and a vitality and spirit far above the ordinary. Much of the keen wit of his famous ancestor Sydney Smith reappeared in him, and for his interest in medical affairs he could look to his grandfather, who was physician to Queen Victoria, and, incidentally, one of the greatest travellers of his day.

Lord Knutsford practised law for some years, but began early to take an active interest in charitable institutions, particularly hospitals. A curious coincidence is related amongst his experiences as a parish guardian. A poor girl was brought into the parish workhouse, whose language no one was able to understand. With great difficulty Lord Knutsford found out the sounds with which she expressed certain wants, and then he wrote to *The Times* and asked for help in interpreting. The letter attracted the attention of a Lithuanian, who recognized the language as his own. He went to see the girl and found that she was his sister, who had come over to join him but had lost her passport and his address.

That was only one of the countless things that Lord Knutsford accomplished by writing letters. It was when he took hold of the London Hospital, after a preliminary canter with the Poplar Hospital, that the full extent of his genius became apparent. He was an administrator of great ability, and it required all his capacities to raise the London Hospital from the contracted and hampered state in which he found it to the full-grown stature of a very large modern first-class hospital. Public support and sympathy was needed, money was very badly needed, and he made it his work to meet these needs. How he did it is well told by his

secretary,* although it was only with difficulty that Lord Knutsford was persuaded to allow any reference to be made to it. "The London" and Lord Knutsford came to be almost synonymous terms, and to a very large number of people they represented at some time or other an appeal to their charity. In one paper a picture of Lord Knutsford appeared with the title "How Much?" His begging was as incessant as it was varied. He realized to the full the value of appealing to the individual as an individual: "It is useless," he said, "to send a letter signed by three millionaires, a bishop and a society lady." His correspondence therefore was a voluminous one. One of his favourite urgings was, "Will you give what you can uncomfortably spare," a phrase which at least one bishop borrowed for his sermon, and which also brought to light the almost incredibly prosaic individual who wrote solemnly to suggest that Lord Knutsford would probably like "to correct the undoubted and unfortunate misprint of 'uncomfortably' for 'comfortably'." A "No" only stimulated him to return to the attack, as in the case of the firm which replied to his appeal:—"We appreciate the honour you have done us to ask us to subscribe to the London Hospital, but our claims are heavy and we cannot do so."

To which he immediately answered:—"You call it an honour to be asked! Surely an honour is worth paying for?"

The firm then replied in verse, but Lord Knutsford countered with a poetic effort of his own, and then the firm probably felt that the joke had gone far enough and sought refuge in silence. But before long they received the following bill:

"To reading a bad poem	0.10.6
To writing a worse one	0.10.6
	<hr/>
	£1. 1.0

Remittance will oblige." And then the subscription was forthcoming.

Then there was the instance of the gentleman who refused a subscription because he had "a tight fit every year to get through." Lord Knutsford's reply was: "You had better come into the hospital. The tight fit you refer to must be delirium tremens." One of the best instances of his quickness in turning a situation to account was in the case of a lady who wrote that she was sending him her bridge winnings of the previous evening. "They ought to have been more," she added, "but my partner revoked." Within an hour she received the following prepaid telegram: "Thanks. Please send partner's name and address."

Once he inserted an advertisement in *The*

* In "The Prince of Beggars": Neville Langton, Hutchinson & Co., London, 1923.

Times addressed to "Ex-mothers", asking for baby flannels—"whatever they mean,"—and material for making them. This brought in mountains of flannel but one giver added the comment,

"I fancy from all that I know of the sex

That a mother's a mother and can ne'er be an Ex."

Upon which Lord Knutsford said to his secretary: "Explain to her that an ex-mother is a child."

One last example of his ingenuity must be given. He noticed an advertisement by a Mr. Kennedy Jones on behalf of a man who badly needed employment, and he at once gave the man work himself. The employment consisted in his calling every day on Mr. Jones to ask for a hospital subscription!

Lord Knutsford's death took place after an illness of some weeks, which required an operation for which he was removed to "The London." But he demurred at being taken there: "The London Hospital," he said, "is for the sick poor, and not for the likes of me."

The modern hospital looks less and less to the individual and more and more to the community for its support; the change is inevitable, though private charity is not likely ever to be completely supplanted. But fortunate will be the hospital in any age who has for its mentor one in whom the stirrings of charity are as active and the zeal for helping as ardent as in Lord Knutsford, "The Prince of Beggars."

Hospital Service Department Notes

THE CANADIAN HOSPITAL COUNCIL

The proposed Canadian Hospital Council, which has been given considerable thought by the various hospital associations in Canada during the past year, was most successfully launched on September 28th. As previously announced in the *Journal*, this Council will really be a federation of existing or future hospital associations or organizations, each participating body sending delegates to confer, from time to time upon those hospital matters which are of general interest or concern.

Delegates were present from all of the provincial, interprovincial, religious and other hospital associations in Canada, and a large number of well known hospital workers from various parts of Canada were present as well. Under the highly efficient temporary chairmanship of Dr. A. K. Haywood, of Vancouver, the preliminary business essential to organization was conducted, considerable discussion being focussed upon the basis of organization and the articles of the Constitution. At the

first meeting the preliminary draft was accepted in principle, and at the subsequent session, the report of the constitution committee under the chairmanship of Mr. L. D. Currie, LL.B., the President of the Hospital Association of Nova Scotia and Prince Edward Island, was adopted unanimously with but a few minor changes.

As outlined in the Constitution, the aims and objects of the Canadian Hospital Council are as follows:—

- (a) To enable the hospitals in Canada to participate with still greater efficiency in a national program of health conservation;
- (b) To co-relate and co-ordinate the activities of the various hospital organizations in Canada;
- (c) To represent the hospitals of Canada in those matters of general or of national interest which concern the welfare of the hospitals or the sick public whom they serve;
- (d) To undertake the study of various hospital problems, such as organization, administration, finance, construction, medical staff, nursing and nurses' education, and the relationship of the hospital to the public, and the imparting of such information to the hospitals of Canada.
- (e) To cooperate with the governments, federal and provincial, and with the municipalities and with any other body or organization in promoting public health and welfare and in furthering the purposes and objects of the Council herein set forth;
- (f) To study hospital legislation in Canada and abroad and assist the various hospital organizations in Canada in the improvement of hospital legislation.
- (g) To undertake whatever proceeding, activity or development, would best achieve the objects herein set forth, subject to the limitations defined in this Constitution.
- (h) To form the nucleus from which, at a later date, should such a development be deemed advisable, may be formed a Canadian Hospital Association.

All hospital associations or hospital organizations represented at the organization meeting are eligible for charter membership in the Council and regional or special hospital associations to be formed in the future may be admitted to membership upon a two-thirds vote of the Council. As the federal government and the various provincial governments are vitally interested in the operation of hospitals, in many of which they direct the administration, it was decided to create an associate membership to which would be eligible the various provincial Departments of Health and the federal Department of Pensions and National Health. No arrangement has been made for the personal membership of any hospitals or individuals, as membership is being limited strictly to hospital associations or organizations and to the various departments of health.

The work of this Council will be to a large

extent advisory and co-ordinative. It has been stipulated in the constitution that

"No action or decision of this Council shall interfere with the autonomy of any participating association. Recommendations of study committees affecting the policies of hospital groups shall be of an advisory nature and shall be referred to the various associations concerned, through their official delegates, for executive action, if any. No financial responsibility shall be involved by the participating associations, other than the travelling expenses of delegates, except upon the approval of each association concerned."

A major activity of the Council will be the preparation of a series of studies and reports by a number of committees, in the choice of whose personnel, the various chairmen will be at liberty to include technical or other experts as desired. Standing committees already named are as follows: Constitution; Construction and Equipment; Legislation and Resolutions; Administration and Statistics; Finance; Public Relations (including Publicity); Medical Relations; Research. Special Committees may be appointed from time to time. It is anticipated that a great deal of the work of the Council will be conducted by correspondence, thus minimizing the expenses of operation. The hospital library facilities and the extensive tabulated data of the Department of Hospital Service of the Canadian Medical Association will be available for the use of the Council at any time.

At the final session the report of the nominating committee, as presented by its chairman, Dr. R. T. Washburn, of the University Hospital, Edmonton, was adopted unanimously. The following officers were elected:

President, Dr. Fred W. Routley, Toronto, Honorary Secretary, Ontario Hospital Association; *First Vice-President*, W. R. Chenoweth, Esq., General Superintendent, Royal Victoria Hospital, Montreal; *Second Vice-president*, Reverend Mother Audet, Campbellton, N.B., Maritime Conference Catholic Hospital Association; *Secretary-Treasurer*, Dr. G. Harvey Agnew, Toronto, Department of Hospital Service, Canadian Medical Association; *Executive Committee Members*, Dr. Geo. F. Stephens, General Superintendent, Winnipeg General Hospital, Winnipeg; L. D. Currie, LL.B., Glace Bay, N.S.

The delegates were most enthusiastic in their decision that this Council be formed and the opinion seemed unanimous that a notable milestone in Canadian hospital history had been erected. The problems of hospital administration, organization, construction, equipment, health service and other activities upon which this Hospital Council could concentrate its attention are, and will be, without end, and it was freely prophesied that the results to be anticipated in the years to come will more than warrant the establishment of this body.

G.H.A.

Provincial Association Notes

THE ALBERTA MEDICAL ASSOCIATION TWENTY-SIXTH ANNUAL MEETING

The twenty-sixth annual meeting of the Alberta Medical Association was held at Calgary on September 16th, 17th and 18th, and was the second largest meeting on record. One hundred and eighty-three members registered. Much interest is always attached to the presence of the visiting representatives from the Canadian Medical Association and we were pleased to have with us Dr. A. S. Munro, the President, Prof. A. Primrose, the President-elect, and Dr. T. C. Routley, the General Secretary of this Association, as well as Dr. G. Stewart Cameron of Peterborough, Ont. They brought messages of good will from our national association and each discussed questions of much importance to the profession at large.

At the annual banquet held at the Palliser Hotel Professor Primrose voiced a plea for the greatest possible cooperation in medical affairs from the medical profession throughout the Dominion, so that there be more unanimity of opinion and that there may be a more strongly organized body of physicians. The Canadian Medical Association stands for a national organization of medicine and this is an ideal condition to have attained. He referred to the one hundredth anniversary of the British Medical Association to be celebrated next year in London when he hoped that there would be a good representation from Canada.

Dr. A. S. Munro, in speaking about the stand which should be taken by the Canadian Medical Association in economic problems, believed that the situation relative to social legislation in each province should be studied, and fundamental principles should be laid down to which the provinces could look in dealing with the problem of social legislation. He did not consider it probable that any government in Canada will introduce any legislation on state health insurance, since the burden on the public would be too great. The only thing to be done is to strive to build up independence among the people where the tendency is to take the offer of free aid which is so general to-day.

Considerable interest was attached to the presence of the Hon. George Hoadley, Minister of Health in this province, inasmuch as he has since taking office strenuously advocated advanced legislation in regard to the medical profession. In his opening remarks he stated that there should be cooperation between the government and the medical profession in safe-guarding the health of the public. The need was never so great for an understanding towards public health as there is to-day. In

the medical profession there is much employment but very little pay. It is one signal opportunity to show the public to-day that it is their life work (referring to physicians). Many physicians were not collecting sufficient to live on, and he has had several requests that grants be given to those requiring assistance. We must realize that we are in the midst of unique economic conditions, not only in the province of Alberta but throughout the Dominion of Canada. He was positive that the economics of the future cannot continue as they have done in the past. Those who have control of our financial system at present have given us no indication of the solution of the problems. They are waiting for the swing of the pendulum, and the pendulum refuses to swing. He hoped that the genius of the Anglo-Saxon race would be able to find a way out. During the past year there were fewer deaths and fewer people went to hospitals. Last year, there were 10 per cent less deaths from digestive troubles than during the previous year. There must be more hospitalization in the future than is the case at present under prevailing financial conditions. As a method of cutting down expenses he thought that building convalescent homes adjacent to hospitals would be of value. This had been carried out in London with much success. In conclusion he said "I plead with you. I want to meet members of your profession this fall. I want to meet your 'key' men, to have your opinions on this question, to see if in some way we can contribute to the problem of hospitalization. We will canvass the whole province and see if we can approach the question and solve the problem and care for the health of the people. We will solve the problem, your problem as well as the people's problem, by serving them."

Dr. T. C. Routley gave a stirring address on the aims of the Canadian Medical Association as well as the close relationship which the national organization bears to each of the provincial associations. He reviewed many facts of interest in the history of the Canadian Medical Associations, especially over the period of the past ten years. Through concerted effort tremendous strides have been made, yet only by continued concentrated action can this Association hope to accomplish as much as it has in the past decade.

At a luncheon given by the Lions' Club at the Palliser Hotel, Dr. G. Stewart Cameron, of Peterborough, Ont., gave an address on "The nursing service and the public." After reviewing the early hospital history of eastern Canada from the foundation of the first hospital in Quebec in 1639 he spoke about the great advances that have been made during the past forty years in scientific medicine which had created a necessity for hospitals and

during the period Canada has seen a very rapid hospitalization. After the year 1873 training schools for nurses were established and the standard of nursing rose greatly. With the building of small hospitals and the establishing of training schools for nurses, competition arose, and as a result young women entered these schools who were deficient in education. There was no co-ordination of the teaching given, with the result that nurses graduated, some of whom were low and others high in proficiency. Another result was an over-supply of nurses. He referred at some length to the report of Dr. Weir of the department of education of the University of British Columbia who had made a survey of nursing conditions throughout Canada. This was in the nature of an educational report which should be dealt with by each province individually. It disclosed the fact that only 3 people of moderate means out of every 8 in the Dominion were able to secure nursing service when they desired it, yet 40 per cent of the private nurses in the Dominion were continuously idle. By a geographical distribution of nurses it was found that only 47 per cent of the population of Canada was able to secure nursing services, also that private nurses in Canada were only employed on an average of twenty-nine weeks a year. The average income for a private nurse was one thousand dollars a year, including living expenses while she was on duty. If this is the situation in regard to graduate nurses what will be the result on nursing schools? If a young woman finds at the age of thirty-five her earnings begin to decline do you think that she will look favourably toward the profession? If not, it is going to be more difficult to obtain nurses in the future, if something is not done to secure the proper women for the profession.

At a luncheon given by the Kiwanis Club, Prof. A. Primrose gave an address on "Cancer", in which he emphasized the necessity of early recognition if the inexorable progress of the disease is to be arrested. He asked the cooperation of the public, yet there was a certain apathy by the public towards the men who were trying to solve many very difficult problems. He warned against the unqualified man who preyed upon the credulity of mankind. Professor Primrose's address was one which appealed greatly to the lay mind.

During the course of the business session a resolution was brought forward by Dr. J. S. McEachern, of Calgary, which if put into effect throughout the Dominion, should result in much valuable knowledge regarding cancer being obtained as well as having far-reaching effects for the public weal. The text of this resolution is as follows. "Whereas the overwhelming majority of the cases of cancer oc-

curing in Canada are first seen by the family doctor, who is most familiar with the environment and habits of the life of his patient, and whereas, another large group of cancer patients are treated by surgeons and other specialists, who are not associated with teaching hospitals, but who have highly trained powers of observation, therefore, be it resolved that the Alberta Medical Association in convention in Calgary request the executive of the Canadian Medical Association, as the representative of organized medicine in Canada, to seriously consider the advisability of sponsoring a movement to secure the cooperation of every practising physician in Canada in the investigation of the cause and the earliest clinical manifestation of cancer. It is suggested that each physician be asked to volunteer to carry on clinical research on cases presenting themselves to him for treatment; that the lines of research be outlined to him by a committee formed for that purpose by the Canadian Medical Association, and further, that each volunteer be required to record in detail all the data suggested on forms to be supplied by the committee. One copy of the report of research in each case shall be forwarded to the central cancer committee. The central cancer committee shall take such steps as may be necessary to have those reports analyzed from time to time, and the results of such analyses shall at all times be available to any research worker on cancer or to any organized body engaged in the fight against cancer, provided only that such individual or organization shall be recognized by the Canadian Medical Association as honest and ethical."

A further resolution was introduced commending that cancer be made a notifiable disease. Dr. M. R. Bow, Deputy Minister of Health, said that this could be done under the Public Health Act by an order in council.

Dr. G. A. Anderson and Dr. W. W. Upton were appointed to a committee making a provincial survey of the nursing problem. Dr. Harold W. Orr, of Edmonton, submitted a report on the Osler Memorial stating that collections had totalled \$1,001.00 from 143 members, an average of seven dollars a member.

Every paper on the program was thoroughly discussed and the contributions were of a high standard of excellence. The following is the list of subjects and the speakers who took part: "Problems of the primipara" Dr. C. F. Covernton, Vancouver; "Spondylolisthesis" Dr. B. Mooney, Edmonton; "Cancer cases which have survived the five year period" Dr. G. H. Malcolmson, Edmonton; "Carcinoma of the stomach and bowel" Dr. G. H. Lennie, Vancouver; "Hip-joint lesions in children" Drs. W. H. McGuffin and R. B. Deane, Calgary; "Treatment of the anæmias" Dr. G. F. Strong,

Vancouver; "Demonstration of the technique used in blood transfusions" Dr. H. N. Jennings, Calgary; "Recent tests of kidney function" Dr. H. Jamieson, Edmonton; "Management of toxic goitre" Dr. F. H. Lennie, Vancouver; "Sciatic scoliosis" Dr. D. S. Macnab, Calgary; "Spinal anæsthesia, with film" Dr. R. O'Callaghan, Calgary; "Infant feeding" Dr. C. F. Covernton, Vancouver; "Significance of ill-defined infection in cardio-vascular disease" Dr. E. P. Scarlett, Calgary; "Nursing services in its relation to the practice of medicine"; "Treatment of ureteral calculi" Dr. Emerson Smith, Edmonton; "A study in records" Dr. A. Primrose, Toronto; "Treatment of heart disease" Dr. G. F. Strong, Vancouver; "Treatment of œdema" Dr. W. H. Gerth, Edmonton; "A simplified insulin technique" Dr. D. G. Revell, Edmonton; "The problems of the general practitioner in the diagnosis and disposal of cases of mental disorder" Dr. C. A. Baragar, Edmonton; "Lecture, with pathological specimens" Dr. Lola McLatchie, Calgary.

The following is a list of officers of the Alberta Medical Association for the following year: *Past-President*, T. R. Ross, Drumheller; *President*, T. W. E. Henry, Fort Saskatchewan; *First Vice-president*, H. A. Gibson, Calgary; *Second Vice-president*, B. J. Mooney, Edmonton; *Secretary*, Geo. R. Johnson, Calgary; *Treasurer*, J. S. McEachern, Calgary.

Members of the Executive Committee to replace retiring members in 1931: J. S. Wray, Lethbridge; A. W. Park, Calgary; J. L. Clarke, Didsbury.

Representatives on Council of Canadian Medical Association: T. W. E. Henry, Fort Saskatchewan; Geo. R. Johnson, Calgary; J. S. McEachern, Calgary; T. R. Ross, Drumheller; W. A. Wilson, Edmonton; F. E. Sutherland, Peace River; R. Parsons, Red Deer.

Editorial Board: G. E. Learmonth, Calgary; (Chairman); H. Orr, Edmonton; T. H. White-law, Edmonton; H. Jamieson, University of Alberta; T. J. Agnew, Peace River; W. J. Campbell, Medicine Hat; W. T. Galbraith, Lethbridge.

G. E. LEARMONTH

ONTARIO MEDICAL ASSOCIATION ANNUAL MEETING, DISTRICT NUMBER SIX

District Number Six of the Ontario Medical Association, comprising the Counties of Victoria, Peterborough, Durham, Northumberland, Prince Edward, Hastings and Haliburton, met in annual conference in Lindsay on Wednesday, September 30th, the hosts being the Victoria County Medical Society.

At the morning session, interesting and in-

structive papers were presented by Dr. Geo. A. Campbell, of Ottawa, on "Difficulties in pædiatrics", and by Dr. W. P. Tew, of London, on "Difficulties in obstetrics".

At 12.30 p.m. close upon one hundred doctors and ladies sat down to a most sumptuous luncheon, prepared by the ladies of St. Paul's Anglican Church. Following this repast, addresses were delivered by Dr. L. J. Austin of Queen's University, Kingston, President of the Ontario Medical Association; Dr. T. C. Routley, Secretary of the Ontario Medical Association; and Dr. W. J. Bell, Deputy Minister of Health of the Province of Ontario.

In the afternoon, Dr. Geo. S. Young, of Toronto, and Dr. L. J. Austin, of Kingston, gave two splendid talks, Dr. Young taking as his subject, "Differential diagnosis of pain in the back", while Dr. Austin spoke on "Gall-bladder problems."

A visit to the splendid Ross Memorial Hospital, the new Maternity wing of which has just been completed, concluded a very happy session.

During the short business session conducted by Dr. Routley, Dr. Geo. Stobie, of Belleville, was re-nominated for the position of *Counsellor*, while Dr. H. M. Yelland, of Peterborough, was elected *Vice-Counsellor*. The invitation of the Belleville men to hold the annual District Meeting in that city next year was accepted with pleasure. District Number Six is to be congratulated on the excellent meeting held this year.

ANNUAL MEETING, DISTRICT NUMBER NINE

The Annual Meeting of the Northern Section of District Number Nine of the Ontario Medical Association was held in Sault Ste. Marie on Saturday, September 5th, 1931, with an attendance of 35.

The scientific sessions were held in the General Hospital, commencing at 2.30 p.m., with an address by Dr. F. F. Tisdall, of the Hospital for Sick Children, Toronto, on "Nutritional factors in the diseases of childhood".

Dr. W. J. Bell, Deputy Minister of Health of the Province of Ontario, then gave a talk on "Mutual interests", touching upon many topics of vital interest to the medical profession and the Department of Public Health of the province.

A very interesting address was given by Dr. A. Primrose, Toronto, President-Elect of the Canadian Medical Association, on "A study in records". Following this, Dr. G. Stewart Cameron, of Peterborough, Chairman of the Study Committee on Nursing of the Canadian Medical Association and the Canadian Nurses' Association, touched upon a few of the points brought out in the Nursing Survey of Canada, just completed by Dr. Geo. M. Weir of the Department

of Education of the University of British Columbia.

At 6.30 p.m. dinner was served at the Windsor Hotel, and followed by a talk on "Medical organization" by Dr. T. C. Routley, Secretary of the Ontario Medical Association. Dr. J. H. Holbrook, Superintendent of the Mountain Sanatorium, Hamilton, then spoke on the importance of preventing cavity formation in the course of pulmonary tuberculosis, and methods to be used in the obliteration of cavities already formed.

Dr. L. J. Austin, of Kingston, President of the Ontario Medical Association, brought the program to a close with an excellent talk on gall bladder problems.

From the scientific as well as the social aspect, the meeting was a decided success and much enjoyed by all present.

At a brief business session held during the day Dr. A. H. McMurchy was nominated *Counsellor* of the District for another year; and Dr. Alexander Sinclair of Sault Ste. Marie, Dr. H. H. Moore, of Timmins, and Dr. Peter McGibbon, of Bracebridge, were elected *Vice-Counsellors*.

ANNUAL MEETING, DISTRICT NUMBER TEN

The annual meeting of District Number Ten of the Ontario Medical Association was held in Fort William and Port Arthur on Monday, September 7th, 1931, with an attendance of thirty.

The morning session was held in St. Joseph's Hospital, Port Arthur, and commenced at 9.30 o'clock with a very interesting talk by Dr. A. Primrose, of Toronto, President-Elect of the Canadian Medical Association, on "A study in records".

Dr. F. F. Tisdall, of the Hospital for Sick Children, Toronto, then gave an address on "Nutritional factors in the diseases of childhood", followed by an address by Dr. J. H. Holbrook, Superintendent of the Mountain Sanatorium, Hamilton, on the importance of preventing cavity formation in the course of pulmonary tuberculosis and the methods to be used in the obliteration of cavities already formed.

At one o'clock luncheon was served at the Shuniah Club, Port Arthur, immediately following which, Dr. L. J. Austin, of Kingston, gave a talk on "Gall bladder problems".

Dr. W. J. Bell, Deputy Minister of Health of the Province of Ontario, was present, and touched upon many problems in which both the medical profession as a whole and the Department of Public Health of the Province are today vitally interested.

At 6.15 p.m. all those present enjoyed a dinner at the Royal Edward Hotel, Fort William, after which Dr. L. J. Austin, President of the Ontario Medical Association and Dr. T. C. Routley, Secretary, spoke briefly on matters pertaining to the work of the Association and the necessity for

organized strength on the part of the medical profession today.

Dr. G. Stewart Cameron, of Peterborough, Chairman of the Study Committee on Nursing of the Canadian Medical Association and the Canadian Nurses' Association, made reference to the nursing survey of Canada which has just been completed by Dr. Geo Weir of the University of British Columbia, and the steps which should be taken to make the findings of the survey of real and lasting value.

A brief business session was held in which Dr. Chas. Powell of Port Arthur was nominated to fill the office of *Counsellor* of the District for next year. Dr. W. P. Hogarth of Fort William was elected *Vice-Counsellor*.

Good weather and that atmosphere of friendliness and enthusiasm which we always find in the cities at the head of the lakes, combined to make this gathering a most enjoyable one.

THE SASKATCHEWAN MEDICAL ASSOCIATION

THE TWENTY-THIRD ANNUAL MEETING

The duties of the executive of the Saskatchewan Medical Association and the duties of the College of Physicians and Surgeons were for the first time clearly defined at the twenty-third annual meeting which was held at Moose Jaw on September 16 and 17. The Medical Association is to have charge of the scientific program and the Council of the College is to be responsible for all business matters which affect the profession. Every year the College will meet and receive a report of the year's work done by the Council. Heretofore the work of the Council has always been carried on in secrecy; no reports were available to the interested practitioners.

Payment for the treatment of indigent patients by the municipalities was discussed at length. The Association had given the executive authority to arrange with the Rural Municipal Association to treat the indigents for 70 per cent of the regular schedule of fees, but the Rural Municipalities would not pay more than 50 per cent of the schedule. Since the committee had no authority to make an agreement for less than 70 per cent of the schedule it was impossible to make any arrangement. The committee was convinced that an agreement of 60 per cent could have been arranged at the time of the first meeting with the municipalities, but since that time economic conditions have so changed that it is now much more difficult to arrive at any understanding regarding payment for the treatment of indigent patients.

The committee on health insurance stated that if the medical men of Saskatchewan desired that health insurance be instituted they should say so frankly. Then it would become

the duty of the officers to investigate as thoroughly as possible the whole question and formulate the best possible scheme. Up to date most of the propaganda for health insurance has come from outside the province. A questionnaire is being sent out to all medical men in the province respecting their earnings for the past four years. If any health insurance scheme were enacted, it would be necessary to know the exact situation of the doctors from a financial standpoint, so that care could be taken to see that they would not suffer financially under any scheme which might be proposed.

The Drugless Practitioners are expected to again ask for a change in the Act, which will give them the right to examine all applicants for registration under the Act, thus removing this authority from the University of Saskatchewan. The Council has already stated its determination to oppose any such change. Anatomy, physiology and chemistry are the same, no matter what therapeutic theory one may hold, and it is believed that the only way that the public can have a reasonable assurance that these applicants have been properly prepared is to have the university examiners pass upon the applicants. It is advisable that the medical man should discuss this important matter with his local member, so that he may be informed as to the full significance of the suggested change.

The Cancer Committee of the Saskatchewan Medical Association submitted this plan to the Saskatchewan Cancer Commission:—

That the personnel of the consultative diagnostic clinic be: director, internist, surgeon, radiologist, pathologist, consulting specialists (on call), secretary (possibly social service nurse), interne nursing and clerical services.

That the appointments to this staff are to be arranged by the Saskatchewan Cancer Commission, either as part or full time, as may be required; that the radiologist will be the radiologist appointed for the Commission; that the internist may be selected by the Commission from among those physicians available, or selected from nominees made by the medical profession, or, in the case of standardized hospitals, the chief of the department of medicine could be selected. The surgeon may be selected from among the senior surgeons on the hospital staff, or the senior surgeons may serve in rotation for stated periods. In the case of standardized hospitals the chiefs of service could be utilized in rotation. The auxiliary staff will be appointed through the Commission, either directly or by arrangement with the hospital.

That radiological and laboratory service will be appointed through the Commission, either directly or by arrangement with the hospital.

That only patients who are referred to the clinic by their attending physicians, as having, or who are suspected of having cancer, will be admitted to the clinic for consultation.

That application for admission to the clinic shall be made to a director of the clinic by the attending physician, in writing.

That certain times will be set for the holding of the consultation service, depending upon the number of cases requiring attention, and as often as necessary. It

will be obligatory upon the clinic staff to be present at such times, which will be arranged with the approval of the Commission.

That before consultation or admission to the clinic, the complete history of the case shall be written up, including any x-ray and laboratory reports and presented with the patient. In making application for consultation, the attending physician must present a case history along with his diagnosis or tentative diagnosis to the director of the clinic.

That the attending physician may attend the patient throughout the consultation and join with the staff in formulating an opinion of the case. The opinion given as to diagnosis and treatment is to be purely advisory and may be accepted and acted upon, or may not, by the patient and attending physician. The result of the consultation shall be given to the attending physician and may be given to the patient when deemed advisable.

That discussion of the case shall not be held in the presence of the patient, so far as diagnosis, prognosis and treatment are concerned. The patient shall remain the patient of the attending physician after the consultation, or until another attending physician is chosen by the patient.

That all deliberations shall be absolutely impartial and any partiality shown by any member of the staff toward the different attending physicians will automatically render him unacceptable for further service.

That tissue examinations shall be made of every tumour where possible, unless detrimental to the welfare of the patient.

That all case histories, reports, recommendations, records, etc., shall be made in writing and in duplicate. One copy shall be sent to the Commission as ordered, and one copy shall be retained for the files of the clinic. Standard forms for the foregoing shall be supplied by the Commission and only such forms are to be used, which are in conformity with those used by the British Empire Cancer Campaign.

That the staff of the consultative service shall be available for periodic check-up of all patients who receive treatment for cancer and as required by the Commission.

That the consultation service shall be supplied at a reasonable charge to the patients for physical, laboratory and x-ray examinations and advice. Any hospital care which is involved in connection with the consultation on the patient, or preparation for the consultation, shall be a charge against the patient by the hospital concerned.

That where consultation reveals a condition, other than cancer, requiring treatment, full particulars shall be sent to the attending physician for his information and guidance.

The committee made the following suggestions relating to the proposed organization of a treatment clinic:—

That the Commission shall arrange with selected hospitals for the establishment of an inside cancer service for the treatment of cancer patients. The staff of the service will meet with the approval of the Commission and the arrangements for the accommodation and care of patients will also be expected to meet with its approval.

That only those patients who have passed through the consultative diagnostic service shall be eligible for attention under the Commission's service, including radium and high voltage x-ray therapy.

That patients shall apply through their attending physicians to the clinic for treatment. The term "attending physician" is interpreted to mean the physician presenting the case.

That the radiotherapist shall be appointed through the Commission and shall make the final decision as to technique, dosage, and method of treatment to be given a patient so far as radiotherapy is concerned.

That when radiotherapeutic measures are required during the course of surgical procedures, the application

of radium or radon, shall be under the direction of the radiotherapist.

That needles and tubes containing radium salts may be only used on patients admitted to the inside cancer service of the hospital. Such patients must remain in hospital until the radium containers are removed.

That where radon containers are used, the patients may be allowed treatment as out-patients, and need not remain in hospital, unless certain types of expensive filters are used, which might be lost.

That the choice of a surgeon rests with the patient and his attending physician. In those cases where the patient or his physician decline to make the choice of a surgeon, then such choice shall be determined by some scheme formulated by the staff of the hospital concerned, and approved by the Cancer Commission.

That after the completion of treatment the patient shall be referred back to his attending physician.

That the Commission shall institute a complete and detailed follow-up system on all patients presented for diagnosis and treatment for cancer, it is expected that the attending physician and patient will be prepared to cooperate with the Commission in making this service efficient.

That the radiotherapist of the treatment clinic shall be the radiologist of the consultative diagnostic staff.

That the hospital in which the clinic is established shall be equipped to do the pathological work of the clinics. Facilities shall be so arranged that that immediate examinations of material at the time of operations can be made if so required by the surgeon.

That the Commission shall require a detailed report on the case record of the surgical procedure carried out on the patient by the surgeon, and a copy of the usual report on the operative findings as is required by the hospital authorities. The foregoing reports shall be attached to the case record for the reference of the Commission and consultative diagnostic staff, in connection with the follow-up service.

The scientific papers included "Management of toxic goitre", by Dr. T. H. Lennie, Vancouver, B.C.; "Diagnosis and management of renal and ureteral calculi", by Dr. W. A. Dakin, Regina; "Problems of the primipara", by Dr. C. F. Covernton, Vancouver, B.C.; "Certain abscess formations complicating suppurative appendicitis" by Dr. G. H. Lee, Shaunavon, Sask.; "Cardiac irregularities", by Dr. G. F. Strong, Vancouver, B.C.; "Carcinoma of the stomach and bowel" by Dr. T. H. Lennie, Vancouver, B.C.; "Infant feeding", by Dr. C. F. Covernton, Vancouver, B.C.; "A study in records" by Dr. A. Primrose, University of Toronto; "Treatment of heart disease", by Dr. G. F. Strong, Vancouver, B.C.; "Report on survey of nursing" by Dr. G. Stewart Cameron, Peterborough, Ont.

LILLIAN A. CHASE

Sir Humphry Rolleston, writing in the *British Medical Journal* of October 25th, 1930, on medicine as a career, states that "the successful doctor requires a love of his fellow men and a sympathy to see into the minds and understand the anxieties and needs of those who come to be helped and cured. Unselfishness, common sense, cheerfulness, reasonable optimism, kindly tact, a good memory, punctuality and methodical habits are among the traits that make the real doctor."

Medical Societies

THE EDMONTON ACADEMY OF MEDICINE

The first meeting of the Academy following the summer vacation was held on September 2nd at the Royal Alexandra Hospital at a dinner in the nurses' dining room, at 7 p.m.

The program consisted of a symposium on "Peptic Ulcer" arranged by the staff of the Hospital.

The subject was taken up in four parts:—

1. The clinical aspect, by Dr. Irving Bell; 2. x-ray by Dr. G. H. Malcolmson; 3. the surgical aspect by Dr. W. A. Wilson; 4. pathology, by Dr. Morton Hall. A most interesting discussion followed the able presentation of these different aspects of the subject.

The October meeting of the Academy was one of special interest and importance as it was planned that it would be given over to addresses on subjects of general interest, by Dr. Tait, Professor of Physiology, McGill University, Dr. Whitnall, Professor of Anatomy, McGill University, Dr. Grant, Professor of Anatomy, Toronto University, and Dr. C. H. Best, Professor of Physiology, Toronto University. The above named professors were visiting Western Canada for the purpose of holding examinations for the degree of F.R.C.S., Canada, early in October, and it was understood that they kindly consented to address the Academy while in Edmonton.

T. H. WHITELAW

THE HALDIMAND COUNTY MEDICAL SOCIETY

The first of four meetings planned to be held this year by the Haldimand County Medical Society took place at the Armouries in Dunnville on September 16, 1931, Dr. A. E. Reszell, President, in the chair. Dr. L. A. Richmond, of Hamilton, gave an interesting talk on "Post-partum emergencies." Dr. John Sheahan and Dr. C. G. Shaver, both of St. Catharines, spoke on the work of the new Sanatorium recently opened at St. Catharines.

W. K. COLBECK

THE REGINA AND DISTRICT MEDICAL SOCIETY

A cancer symposium was held by the Regina and District Medical Society on September 28th. Dr. Sydney Larson spoke on "Regina General Hospital and Provincial Statistics." Saskatchewan has the lowest cancer death rate of any of the provinces because it has the lowest proportion of people over 50 of any. Because the proportion of people over 50 is increasing the cancer death rate is increasing. In five years the increase in cancer death rate was 7 per 100,000.

Dr. H. C. George considered the medical aspects of cancer. He stressed the preventive measures that should be taken, such as the elimination of focal infection and of chronic irritations and the removal of small, supposedly innocent tumours. After a patient has been treated by surgery or radium the symptom of undernutrition and anaemia should be carefully treated. He said that if more attention were given to the finer details of treatment high doses of morphine would not become necessary so early.

Dr. F. C. Corbett took up the surgical aspects of cancer, he emphasized the importance of complete removal of the gland-bearing area in the region of the cancer. A five years' period for cure is not long enough. He cited the case of a woman who had had a scirrhus carcinoma of the breast for fourteen years.

Dr. C. M. Henry said that the presence of metastases was evidence of neglect or inadequate early treatment. While it is true that we do not know the cause of cancer we do know the causes. While the grand total of cancer patients reaches impressive numbers there are very few patients per doctor. In the United States there is less than one case for each doctor; therefore there should be cancer centres where the latest knowledge can be applied to large groups.

LILLIAN A. CHASE

University Notes

University of Manitoba

Friends of the university were pleased to learn on the recent visit of Hon. Gideon Robertson, Minister of Labour, that an arrangement had been entered into between the federal and provincial governments which permits work to be begun on the new science building to be erected on the Agricultural College site in Fort Garry.

The corner-stone of the new Arts Building of the University on the Agricultural College site, was laid on September 26th by the Chancellor of the University, Most Rev. Dr. S. P. Matheson. Premier John Bracken delivered an address to the distinguished group gathered to witness the ceremony.

McGill University

Founder's Day at McGill University which on October 6th marked the 187th anniversary of the birth of James McGill in Glasgow, was honoured by holding the annual fall convocation and the mounting of a guard of honour beside the McGill monument on the campus. A detail of 25 men from the Grenadier Guards, a regiment which traces its descent back to the

Montreal unit which Col. McGill commanded, and the Grenadier Guards' band added colour and life to the University grounds.

At the convocation ceremony, Sir Arthur Currie, the principal, conferred degrees upon 52 candidates. Sir Arthur was surrounded on the platform in Moyse Hall by the deans of the various faculties, the professors and principals of affiliated colleges.

Following the conferring of degrees, Sir Arthur delivered the Founder's Day address in which he paid tribute to Colonel the Honorable James McGill, successful Scottish fur trader and merchant who left his estate and a considerable sum of money for the purpose of founding a college in Montreal. The principal emphasized the unselfish public spirit which distinguished the founder and stated that his record of public service was worthy of emulation.

The McGill Guard under the command of Lieut. J. G. Stewart, a law student, left the Grenadier Guards' Armory on Esplanade Ave. after 3 o'clock and marched to the University via Park Ave., Durocher Street, and Milton Street to the University. At four o'clock the guard passed to the left of the McGill monument giving eyes right on reaching the monument and eyes front on passing it.

Sir Arthur spoke to the men, complimenting them upon their smart appearance.

Two guards were told off and mounted in front of monument which marks the last resting place of the Founder. They were posted with arms reversed. Two sentries were posted between Moyse Hall and sentry boxes. The guard was relieved every 10 minutes until 5 o'clock when the ceremony of Convocation commenced in Moyse Hall.

The Quinquennial Reunion

The Quinquennial Reunion of the university was held from October 13th to 17th, and was very successful. The attendance was, considering the times, satisfactory, 1,197 graduates having registered. Most of the provinces of the Dominion were represented, and some men coming from as far as Florida on the south and Washington on the west. On the whole the weather was propitious, though the last day was marred by almost continuous rain, interfering with the intercollegiate football match.

The proceedings began with the decoration of the Founder's Tomb, the various War Memorial Tablets, and the bust of Sir William Macdonald.

On the next day, Wednesday, a special convocation was held, the teaching staff, graduates, and undergraduates marching in procession to Loew's Theatre where the function was held.

Drawn by 25 breathless students, Right Hon. Richard Bedford Bennett, Prime Minister of the

Dominion of Canada, and E. W. Beatty, K.C., Chancellor of McGill University, made a flying trip across the university campus in an ancient cab, in something under 25 seconds flat. Both enjoyed their trip in the vehicle, which bore a "No Parking" sign on the front seat, and emerged smiling at the Arts Building, the end of the run.

Honourary degrees were conferred upon Premier Bennett and three graduates: F. W. MacLennan, prominent engineer and minero-logist; Hon. A. C. Rutherford, chancellor of the University of Alberta; and Dr. W. Harvey Smith, former president of both British and Canadian Medical Associations.

The Premier's address to Convocation was an inspiring call to all and especially to the university people to rise to the occasion and do their duty. It was also a word of cheer.

"The storm may not have spent itself, but the worst is over. Why do we hesitate or fear? Why have we the fear that comes from vacillation and dismay? If there were any basic weakness in our economic structure, if we were without resources, if we were weak in our governmental and economic structure and had been thrown into social chaos, then we would indeed be in urgent need of some outside help to lift us out of the morass. But Canada needs no help from others as long as we are all willing and ready to help our fellow citizens.

"There is no factor in our domestic situation which we can fairly say is responsible for our present situation, that we are not correcting. And if we have made mistakes regarding which there may be differences of opinion, it would not be fair to discuss them here. But we have lost nothing but confidence in ourselves. We must regain it. We can regain it, if each of us will look at the facts, and recapture the faith without which we cannot prevail.

"We are told by some that improvement is impossible until world conditions have improved. If our national life and business is to be controlled by others than ourselves, they never will improve. Such craven thought and spirit, whatever prompts it, would drive this country into perpetual bankruptcy.

"World conditions will improve. Civilization is hoping and praying for better conditions. But some nation must lead the way. Why should it not be our own Canada?

"Review our past achievements. Remember the many triumphs of our short history. Hold in mind our vast wealth, our sane system of Government, our sound institutions, our unique position in international affairs, our untiring energy, our unity of purpose, our youth, our glorious youth, our youth against the age of other peoples, and march on, secure in the knowledge of better times for those whose faith in themselves hard times have left unshaken.

"You men and women of the university whose teaching and experience have equipped to grapple with the obstacles in the path of our progress, I call upon you to bend your energies to the task and to say to those who would hesitate and turn aside, in the words of a great university president of over a hundred years ago: 'Who gave you furlough? Who discharged you from service, until the fight is won'."

Another feature of the Convocation was the unveiling, by Dr. A. W. McClelland, of a Tablet to the memory of Dr. Alexander W. Thornton, late Dean of the Faculty of Dentistry. Dr. C. F. Martin, Dean of the Medical School, pronounced the eulogy.

In the evening a Smoker was held at the Armoury of the Black Watch, which was largely attended. A long and lively program had been arranged. There were three boxing bouts between McGill and Black Watch teams and a comic wrestling bout which the spectators apparently enjoyed far more than did the participants.

Sir Arthur Currie, the Principal, welcomed the visitors and addressed them on the present status of McGill, its aspirations, and its future, dealing also with the important matter of preliminary school education.

On Thursday the new residential wing of the Royal Victoria College was formally opened. The guests were received by Mrs. Walter Vaughan, the Warden, and by Dr. Hilda Oakeley, the first Warden, who was there from 1899 to 1905. Dr. Oakeley is now a lecturer in philosophy at the University of London.

The graduates of two periods of McGill's history were represented by the two guests of honour, Prof. Carrie Derick, who recently retired from the chair of biology, and Dr. Oakeley. Miss Derick dates back to the times when the women had no college of their own, and Miss Oakeley represents the beginning of the Royal Victorian era.

Tea was served in the dining room of the old building where the life-sized portrait of the late Lord Strathcona, whose generosity built Royal Victoria College, smiled benevolently upon the graduates and the undergraduates who attended the reception.

On Friday the Intercollegiate Track Meet was held in the afternoon, McGill, Toronto, and Queen's Universities being represented. McGill won on points with a score of 69, Toronto totalling 55 and Queen's 11.

In the evening the Reunion Dinner was held at the Mount Royal Hotel. Mr. H. M. Jaquays, the president of the McGill Graduates Society was in the chair, and, after the toast to the King, Dr. C. W. Colby, a former professor of history in the university, proposed the toast to McGill, which was replied to by the Chancellor,

Mr. E. W. Beatty, K.C. A large gathering was present. It was particularly gratifying to see so many of the "Old Guard" there, men who received their degrees in the '70's. McGill's oldest graduate was present also, in the person of Mr. John Redpath Dougall, who received his B.A. in 1860.

On Saturday the chief events were the Toronto-McGill football match which was won by McGill with a score of 8 to 6, and the Toronto-McGill boat race, won by Toronto by three boat-lengths. The course was two miles and the time, 12.10.

The celebration closed with various class dinners in the evening. During the Reunion, for the benefit of the medical graduates, numerous clinics were held at the Montreal General, the Royal Victoria, the Children's Memorial, the Shriner's, and the Royal Victoria Maternity Hospitals. The various buildings of the university and the hospitals were thrown open for the inspection of the visitors. Altogether, the success of the gathering was gratifying.

McGill University was represented at the recent meeting of the British Association for the Advancement of Science by three members of the staff, Dr. A. S. Eve, Prof. F. E. Lloyd and Prof. Frederick Clarke.

Special Correspondence

The London Letter

(From our own correspondent)

Centenary celebrations have served to cheer us in the depressing days of last month, and it is interesting to speculate what the British Association for the Advancement of Science would be talking about to-day if, in the course of the few weeks before it was founded in 1831, one of the laboratory assistants at the Royal Institution had not made the crucial discovery that magnetism could be converted into electricity. Michael Faraday's attachment to the medical profession is well known and his original observations have made fundamental alterations in almost every branch of medicine. The diagnostic value of applied electricity in the realms of radiography and electrocardiography and the therapeutic uses of electricity, yet in their infancy, are among some of the many benefits which his pioneer labours have conferred upon mankind. The Faraday celebrations have been allowed to overlap the hundredth meeting of the British Association in London, and the latter, just closing as this letter is being prepared, has included as usual many papers and discussions of interest to the medical profession. Sir J. Arthur Thomson in a popular address on "Biology in the Service

of Man" showed how many of the advances of the medical branches of bacteriology, protozoology and parasitology are strictly biological. In a paper on "The Social Aspects of Mental Deficiency" Dr. E. O. Lewis indicated the complexity of type as well as of grade of defectives and sketched the relationship between pauperism, slumdom etc., and mental deficiency. Professor Valentine continued his observations of last year on the psychology of early childhood and stressed the importance of careful observation of a child's reactions to ordinary daily events in addition to the usual artificial experiments.

The fact that we have had a census this year gives a greater precision than usual to the vital statistics contained in Sir George Newman's "On the State of the Public Health," his annual report as chief medical officer of the Ministry of Health. This recent publication shows that the birth rate (16.3 per thousand living) is only half what it was in the Victorian era but the death rate (11.4) is also down to a low figure, while the infant mortality of 60 per thousand births is the lowest yet reached and less than a half of what it was in the closing decades of the nineteenth century. Invalidity cannot, like death, be satisfactorily defined and recorded on a statistical basis, but calculating the sickness rate among the fifteen millions of the population who are insured, Sir George Newman points out that in 1930 a total of 26½ million weeks' work was lost as a result of sickness and disablement. Throughout the report it is obvious that the official view of the general practitioner is that he is the patient worker upon whom all schemes of bettering the public health depend and the insurance system has no fiercer champion than the medical officer of the public health service. Of particular interest in this year's report is the account of the early results of the taking over of the poor-law functions by the municipal and county authorities under the new Local Government Act. In London, with special problems of its own, one of the difficulties has been the overcrowding of the infirmaries (as the old poor-law institutions were called) because of their greatly increased popularity under the new régime, and these now treat practically the same type of case as the large voluntary hospital. The question of making use of these institutions for teaching purposes is under close consideration.

It has been pointed out more than once in these notes how the motor car is a menace to life and health in these islands comparable almost to the ravages of the most virulent bacteria. One of the problems arising out of this state of affairs has been the cost to hospitals of treating victims of this modern juggernaut. Small cottage hospitals near main roads or dangerous corners find themselves after a fine week-end filled up with motoring casualties of whom only a small percentage ever pay their dues. The new Road Traffic Act sought to remedy this by giving hospitals a claim on insurance companies in connection with the now compulsory third-party

insurance, but the legal language of the part of the Act dealing with this has been too much for most ordinary folk until the Central Bureau of Hospital Information had the good idea of publishing an interpretation by a barrister, prepared for everyday consumption. From this it seems that it is only in respect of a very restricted class of victim that the expenses of treatment can be recovered by hospitals from insurance companies, and the owner or driver of the car responsible for the accident is not included, nor are the occupants of this car unless the insurance policy has been specially drawn up to this effect. On the question of negligence it will have to be decided first of all which car is responsible and the prospect of the hospitals getting much after the litigation necessary to establish the answer to this question is remote. So, after all the bother, it is unlikely that the new Act will really help us very much.

ALAN MONCRIEFF

London, October, 1931.

The Edinburgh Letter

(From our own correspondent)

An interesting book, "Naval Customs and Traditions", by Rear-Admiral Gerard Wells has appeared recently. One of the most amusing stories in it is an entertaining theory of how surgeons were obtained for the Navy, by trapping Scotsmen in much the same way as wild animals or birds are captured:—"Apparently most of the doctors in the Navy came from Scotland. During the seventeenth and eighteenth centuries the principal exports from Scotland were said to be 'birch brooms' and doctors. It is also said that when the Navy was short of doctors a frigate would be sent to cruise inshore off the Scottish coast; whenever a group of natives was observed standing on the beach, a jolly-boat, filled with porridge, would be veered astern till it touched the beach. The natives would crowd into the boat after the porridge and then the jolly-boat would be hauled off to the ship, and would always be found to be full of doctors." Whatever may have been the method adopted by the naval authorities for renewing the supply of doctors from Scotland they were certainly successful in obtaining some worthy recruits.

Tobias Smollett, who qualified in Glasgow, accompanied the British Fleet in the capacity of surgeon's mate when it was ordered to attack Carthage, the great stronghold of Spanish America in 1741. In the pages of "Roderick Random" he has left us a memorable picture of the miseries endured by sailors and soldiers which historians have been content to accept as first-hand evidence. He revealed the seaman in such true lights, depicting his character and defining his personality, that Sir Walter Scott considered that everyone who had written of the Navy since seemed to have copied more from Smollett than from nature.

Another great authority on all matters connected with the diseases of seamen was James Lind. He was born in Edinburgh in 1716. During ten years at sea he saw much service in the English Channel and sailed to the Mediterranean, the Guinea Coast and the West Indies as a surgeon's mate. He gleaned a first-hand experience of the deadly effects of tropical climates upon the health of ships companies. The ravages of scurvy were forcibly brought home to him by two outbreaks which occurred while cruising in the Channel. After leaving the sea, Lind graduated M.D. at Edinburgh University. He also became a Fellow of the College of Physicians and was subsequently nominated its Treasurer. He resigned this office in 1758 on his appointment as Physician to Haslar Hospital. At Haslar he had unique opportunities for the study of scurvy, at that time one of the chief sources of sickness in the Navy. He wrote a book on the subject which appeared in 1753 recommending the use of lemon juice as a remedy. Although his work attracted small attention during his life it subsequently obtained wide recognition. In 1795, an order for a general supply of lemon juice to H. M. ships was issued, and in a few years scurvy was a thing of the past. Lind was also the author of two books on naval and tropical hygiene.

Thomas Trotter, who was a contemporary of Lind, though considerably his junior, was born at Melrose in 1760 and educated at Kelso. He speaks of Lind as the "Father of Nautical Medicine", and considered that his "work will remain a valuable legacy to the naval service of Great Britain." Trotter saw service as surgeon's mate on the *Berwick* in 1779 and sailed to the West Indies, where he had practical experience of scurvy. In 1781 he was present at the Battle of the Dogger Bank. He also sailed on a slaver, an adventure that left him permanently disgusted with the conditions of the slave-trade. He obtained his M.D. at Edinburgh in 1788. In 1793 he became second physician at Haslar, and in 1794 was physician to the Channel Fleet under Lord Howe. While at Haslar, Trotter was responsible for improving the state of the Hospital. He did his utmost to improve the conditions of diet and hygiene in the Navy, and attempted to introduce vaccination, without success. Trotter was a prolific writer on a wide range of subjects from "The Hermit on the Tweed" to articles on seaweeds, scurvy and drunkenness. The Royal College of Physicians of Edinburgh possesses four of his original publications.

Sir Gilbert Blane, Bart., was another Scotsman who had a successful career in the Navy. He was born in 1749, the fourth son of Gilbert Blane of Blanefield, Ayrshire. He graduated M.D. at Glasgow in 1778. He was a pupil of the great Dr. Cullen in Edinburgh and was introduced by him to William Hunter. Blane became private physician to Admiral Rodney and sailed with him to the West Indies in 1779,

where he was present at six general engagements. In 1793 Blane recommended lemon juice to the Admiralty as a means of preventing scurvy, and in 1795 was responsible for the order for a general issue of lemon juice to H. M. ships. Blane was appointed physician to St. Thomas' Hospital and became physician-extraordinary to the Prince of Wales. At the recall of the disastrous Walcheren Expedition, he was made responsible for the arrangements for the sick and wounded. The Gilbert Blane medal, which was founded in his memory, is awarded annually to the naval medical officer who obtains the highest aggregate marks at the examination for promotion to the rank of surgeon-lieutenant-commander.

Sir William Burnett, K.C.B., was born at Montrose in 1779. He was Doctor of Medicine of Aberdeen University and a Fellow of the Royal College of Surgeons of Edinburgh. He served in all the great naval victories of the day—Cape St. Vincent, the Nile, Ferrol and Trafalgar, and was rewarded with the C.B. and four medals. In 1814 he went to Kronstadt as physician to the Russian Fleet. Burnett was responsible for improving the conditions of service for assistant surgeons in the Navy. He founded libraries and museums at the hospitals at Haslar and Plymouth. In 1822 he was successful in being appointed head of the Medical Department of the Navy. He retired in 1855 at the age of 76.

A contemporary of his, Sir James Macgregor, another Scotsman, was Director-General of the Army Medical Services for 36 years, from 1815 to 1851. These two Scottish Director-Generals of Medical Services received the K.C.B. from Queen Victoria on the same day—August 17, 1850. Both saw much war service and both lived to be over 80. Long service was evidently the fashion in those days.

Sir Henry Hallford was President of the Royal College of Physicians of London for twenty-four years (from 1820 to 1844), and Dr. James Sims was President of the Medical Society of London for twenty-two years (from 1786 to 1809). When Sir William Burnett retired in 1855, another Scotsman, Sir John Richardson, narrowly failed to succeed him as Director-General. He was in command of Haslar Hospital from 1838 to 1850, except for the years 1848-49 when he joined the Sir John Franklin Relief Expedition. Huxley, who was for a short time a naval surgeon, dedicated his "*Occansa Hydrozoa*" (1859) to him.

Thomas Shortt was another Edinburgh physician who saw service in the Mediterranean. He was present at the autopsy on Napoleon at St. Helena. He subsequently practised in Edinburgh for a number of years.

William Anderson, an Edinburgh surgeon, accompanied Capt. Cook as surgeon's mate on the *Resolution* in 1772-75, and as naturalist on the same vessel on the third and last voyage. He died of consumption on August 3, 1778, and land sighted soon afterwards on the N.W. coast of North America was called by the great commander Anderson Island. From the above it

will be seen that, porridge or no porridge, the country which produced such great sea-fighters as Admirals Duncan and Cochrane and Paul Jones was not behindhand in bringing forth illustrious members of the equally important non-combatant services.

GEORGE GIBSON

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The Irish Letter

(From our own correspondent)

In these days of commercial depression the hospitals of Northern Ireland are not enjoying that measure of voluntary financial support which they have a right to expect, and without which their beneficial work cannot be carried out. There are many people who are not subscribing so freely as formerly, and there are many others who take advantage of hospital treatment and make no payment in return though well able to do so. It is possible that these omissions may be due to thoughtlessness, but it adds greatly to the troubles of those responsible for the management of hospitals. Speeches recently delivered by Dr. Wiclif McCready and Mr. S. T. Irwin at the annual meeting of the Belfast Ophthalmic Hospital draw attention to the abuse of privileges. Dr. McCready told of cases where people drove up to hospitals in their own motor cars, received treatment, and drove away without making any payment. Mr. Irwin said that at the Royal Victoria Hospital, Belfast, a certain part of the courtyard was supposed to be reserved for the accommodation of the motor cars of the visiting staff, but this area had recently been so overcrowded by private motor cars of non-paying patients, and taxi-cars hired to take them to hospital that staff cars were unable to find parking space. Medical men who give honorary service to the hospitals feel that they are having an undue burden imposed upon them by dealing with a class of patient not originally intended to come within the scope of hospital treatment. It certainly does not seem unreasonable to expect that those who own motor cars, or who can afford to pay for the hire of a taxi-car, should contribute towards the upkeep of hospitals, and make some small recognition of the services rendered them. While the income from investments is shrinking, owing to the depreciation of securities, bequests and donations are falling off, and subscriptions are dropping owing to the hard times through which we are passing, the question of whether patients who are able to do so should not contribute towards their own treatment becomes more and more acute. Again, the medical benefit system now in force in Northern Ireland has added largely to the burden imposed on the hospitals, as many "panel patients" are sent to hospitals for special treatment for certain ailments. In the last year, it seems, the demand upon the hospitals from this class of patient has been assuming large dimen-

sions. A new and rather formidable problem has thus been created which will require a practical solution.

In the Free State the question of hospital funds and sweepstakes still forms a subject for heated discussions. But those who oppose the sweepstakes method of obtaining funds seem to be gaining support to their views. The case of Sir Patrick Dun's Hospital is of special interest in this matter. This hospital has lost its former share of the Dublin Hospital Sunday Fund Collections. The share averaged in recent years over £300. General subscriptions have fallen away, and it now appears that the Dublin City Manager's estimates for the present year include only half the usual amount of contribution from the municipal funds for this particular hospital. From the information at present available it seems that the annual income of this one hospital, apart from sweepstakes proceeds, will be down by an amount approaching £1,000. It may be added that some hospital authorities have been informed that intended bequests have been cancelled in view of the participation in sweepstakes, and it is not to be supposed that the full effect of the participation on the ordinary subscription list has been felt. The National Children's Hospital of Dublin is excluded from further benefit from the Dublin Hospital Sunday collections, having participated in the Sweepstakes fund. The following ten hospitals are to continue to rely on the older method of voluntary contributions:—Steeven's, Mercer's, Drumcondra, Rotunda, Royal Victoria Eye and Ear, Convalescent Home, Adelaide, Monkstown, Ortopædic, and the Rest for the Dying.

At the Annual Meeting of the Irish Medical Association Dr. Eugene Byrne, of Slane, was elected President. This association has been in existence for ninety-two years, and during this time it has laboured constantly on behalf of the medical profession in Ireland. But during the last few years there has been some decline in the number of members, and an active campaign will be begun to increase the membership and to renew the vitality of the association as an instrument for the welfare of the profession.

The Ulster Medical Society also held its Annual Meeting, and Mr. S. T. Irwin, F.R.C.S.Ed. was elected President. This society is a very active one, and it now proposes to issue a quarterly publication which is to be known as the Ulster Medical Journal. A strong editorial board, consisting of the Professors of Medicine, Surgery, Gynæcology, and Pathology at Queen's University, Belfast, has been appointed, with Dr. R. H. Hunter as the Acting-editor. It is hoped through this journal to increase the influence of the Belfast Medical School throughout the Province, and at the same time help the country members of the Society to keep in touch with those phases of medical progress particularly suited to the conditions found in Ulster.

The medical school of Northern Ireland is

part of the Queen's University, Belfast, and it is the fourth largest medical school in the British Islands. In common with other British Schools of Medicine it is at present considering various schemes for extending the curriculum in such a manner as to fulfil the recommendations of the General Medical Council for a six years' course, instead of a five years' course as at present. A first change has already been put into operation whereby students must pass a pre-registration examination in physics and chemistry before entering the medical school. It is doubtful, however, if this arrangement will last for any length of time, as many members of the medical faculty do not believe this to be in the best interests of the medical student, as it involves his laying aside the purely cultural portion of his education, and specialising at too early a period of his career. The result of such a course would be the admission of men who could not, by any stretch of imagination, be considered "educated" in the broad sense, and this certainly would not be to the interest of the profession as a whole.

The Queen's University, Belfast, has just suffered a serious loss in the removal of Prof. A. Murray Drennan, who has been appointed to succeed the late Professor Lorrain Smith, F.R.S., at the University of Edinburgh. Professor Drennan succeeded Prof. St. Clair Symmers in Belfast just two years ago. As a new Pathological Laboratory is at present being erected, and the work of this department re-organized, the loss of Prof. Drennan at this juncture is a severe one. It is hoped that a really worthy successor will be found.

A group of forty members of the Inter-State Post-Graduate Medical Association of North America visited Ireland during the summer. They spent two days in Dublin visiting the clinics of Sir William Wheeler, and two days in Belfast, visiting the clinics of Prof. Andrew Fullerton. The managing director of the group was Dr. William B. Peck, of Freeport, Ill., U.S.A., and in an interview he commented favourably on the work done in the clinics visited. He expressed the hope that some members of his Association would come back to Ireland and undertake prolonged courses of post-graduate study. The work in Ireland he thought to be of a very high standard and of a character particularly suited to the needs of American practitioners. A very warm welcome will be given, both in Dublin and Belfast, to any medical man acting on this suggestion. Mr. Fullerton is an Honorary Fellow of the American College of Surgeons.

Ireland has become a favourite centre for the holding of medical congresses. The Anatomical Society of Great Britain and Ireland and the British Association of Surgeons held their Annual Congresses in Belfast this year; while Dublin has had the privilege of being the centre chosen for the ninth Annual Meeting of the Royal Medico-Psychological Association. Dr. Ariens Kappers, of the Dutch Central Institute for Brain Re-

search, was a distinguished guest at the meeting. He received the honorary degree of Doctor of Medicine of the University of Dublin, and delivered a series of three instructive lectures at Trinity College, to which members of the medical profession were invited. Dublin has also been selected for the venue of the 1933 Annual Meeting of the British Medical Association, and preparations for it are already well ahead. One matter of importance is the choice of the Branch nomination for the Presidency of the Association, and Dr. Thomas Gillman Moorehead has been the unanimous selection for the honour. Dr. Moorehead is Regius Professor of Physic in Dublin University, and at present is President of the Royal College of Physicians of Ireland, and President of the Royal Academy of Medicine in Ireland. He is one of the outstanding medical personalities in the country: he is almost completely blind, yet so great is the confidence of his professional brethren in his opinion, that he carries on one of the largest consulting practices in Ireland. There are other leaders of the profession in Dublin who, no doubt, could also have fulfilled the duties of the office with distinction, but it is a happy augury for the success of the 1933 meeting that the choice of a President should have been made unanimously. Dr. J. P. Shanley and Prof. J. W. Bigger have been appointed joint honorary secretaries for the meeting, with Dr. W. D. O'Kelly and Alderman Hubbard Clark honorary treasurers. The Minister for Local Government and Public Health of the Irish Free State, Mr. Richard Mulcahy, has promised the help of his department; the Lord Mayor, on behalf of the municipality of Dublin, has offered accommodation in the Mansion House for offices, and has promised the help of the city in every way. As the British Medical Association has a membership of about 36,000, two years is not too long a time for the organization of the meeting.

Mr. Mulcahy has recently come into the limelight by the forecast he has given of the reforms he intends to bring about in the system of local government. The present wasteful duplication between County Councils and Boards of Health is to be abolished, as the latter are to be suppressed. Mr. Mulcahy also hopes to give the secretaries of the local authorities certain managerial powers which would make co-ordination of different activities more effective. Ireland would thus seem to be on the verge of a complete autocracy. But it must be admitted that experience in the Free State, so far, has justified the powers hitherto given managers in the administration of certain other aspects of local government.

In the Northern Parliament Prof. R. J. Johnston (M.P. for Queen's University, Belfast), has been giving voice to the disappointment of the medical profession at the failure of the Northern Government to tackle the problem of local government and public health. One item of pressing need is the establishment of an open-air

epileptic colony. At the present time epileptics in Northern Ireland, unless their relatives or friends look after them at home, are segregated in workhouses. This is not at all desirable, and it is hoped that the recently closed Richhill farm training centre will be utilized to establish such a colony, and thus relieve the workhouses of an unnecessary population. The other problems of poor-law reform could then be undertaken, more particularly that of the dispensary medical districts, where, only too often, paupers and respectable working people are classed as a single unit, and sit side by side awaiting their turn to consult the doctor. It seems rather an error in judgment in these days, that the taint of the Poor Law should hang over this important medical service.

RICHARD H. HUNTER
20 Haypark Avenue, Belfast.

Topics of Current Interest

The Cost of Medical Care

Sickness costs must be distributed over the group; the individual poor or middle class employed person, or head of a family, cannot budget for sickness because it is not predictable whether he will be afflicted at all, or have a \$15 sickness, or a \$75 sickness, or a \$475 sickness, but if distributed over the group in the form of sickness insurance, \$8 to \$15 per person a year would pay for all the expenses of hospital care and professional fees for acute illness. This is the opinion of Michael M. Davis, Director of Medical Service of the Julius Rosenwald Fund, and a member of the Committee on the Cost of Medical Care, whose book, "Paying Your Sickness Bills," has just been published by the University of Chicago Press. Group insurance is the most practicable and equitable method to insure competent professional care of the sick, and at the same time eliminate the \$365,000,000 a year medical charity now given by doctors, hospitals and clinics, Dr. Davis believes. He points out that this excessive charity practice, in the form of outright free service to approximately 7 to 10 per cent of the population, and reduced fees to another 20 per cent, results in 35 cents of the paying patient's dollar going to the doctor's "overhead." This heavy overhead is due to the doctor's expensive education (estimated at \$10,000), the costly equipment he must have, and the fact that he must earn his entire livelihood in about one-third of his working time, devoting the balance to charity and to "professional advancement." The typical commercial sickness insurance policy, costing about \$60 a year, does not meet the needs, in Dr. Davis' opinion, because it covers an individual only, and not his family, and because it

limits its liability to a sum that will not cover the "high cost illnesses"—and because the wage-earner hasn't \$60 a year to spend on sickness.

Dr. Davis discusses various forms of industrial insurance now used in this country, and plans used in Germany, France, and other foreign countries. He also considers the extension of taxation as a means of distributing the cost of sickness, and discusses its present application to smallpox and mental diseases.—*University of Chicago Press.*

Medicine and its Co-dependents

At the meeting of the Middlesex County Medical Society held on July 15, 1931, an address was given by Dr. Angus McLean, of Detroit, on "Medicine and its co-dependents," which was well received and discussed by members present. At the close of his address Dr. McLean was presented with a certificate of Life Membership in the Society by the President, Dr. J. G. Colling.

In his talk, Dr. McLean stated that there were 2,000,000 individuals living off the sick, including orderlies, social workers, laboratory employees, and other individuals connected with hospitals. If the state took over the practice of medicine, this item alone would run to \$10,000,000 per day, figuring that the average daily wage for the workers would be \$5.00. This would amount to \$3,650,000,000 per annum—a fat sum to be paid by the taxpayers!

"Again, take the drug item! The annual bill of a state drug house would run into the millions," stated Dr. McLean. He cited the example of the free clinic run by physicians in Hungary which included no pharmaceutical service. A person who went to this clinic got medical attention free, but had to go to a private pharmacy to get prescriptions filled. The medicine was so costly that soon the people refused to attend the clinics and they were subsequently closed. "If the people want state medicine, they must consider the question of drugs to the sick, and they must figure on paying the high cost," stated Dr. McLean.

"There are 155,000 physicians in the United States, according to the American Medical Association," said Dr. McLean. "Let us figure that each makes an annual average income of \$5,000. Roughly speaking, this means the profession will receive from the state \$750,000,000 per year, and when I say 'from the state' I mean that the people will pay this three-quarters of a billion dollars to the doctors." Dr. McLean brought out the fact that one physician indirectly supports twelve people, including nurses, receptionists, stenographers, etc., and if state medicine is ever adopted, the people will pay princely taxes, not only to support doctors but

to all directly and indirectly dependent upon them. He called attention to the government's grandiose idea of transporting patients and drugs by airplane from one state to another and from one country to another. "If we have state medicine, we can expect that the government will use airplanes commonly for all types of rush service, with the people paying for all these expensive frills."

Dr. W. J. Stevenson, of London, suggested that the medical profession is not in as good favour with the people as it was some ten years ago, due to the fact that certain rich and social minded citizens who individually have become dissatisfied with costs of medical care are encouraging free clinics and pauperization. He stated the public expects that the family doctor will do more, and will call in a specialist only as a last resort. Dr. Stevenson stated that the future success of medicine as an independent profession depends upon the family doctor and his relation to the public. "The expense of medicine to the state must be limited," stated Doctor Stevenson.

Dr. W. H. Woods, Secretary of the Society, stated: "I have felt for years that no government has an invisible gold mine at its command, that its only source of revenue comes from its taxation powers, and there are limits beyond which taxation cannot go. Thus it follows that no government can afford to take on the various forms of socialistic and paternalistic services which the present day demands, state medicine among them. If medical service is simplified, the average individual will be able to secure and pay for a service which will be satisfactory to all but neurasthenics."

Income from Medical Practice

From the study of 6,328 random reports of physicians from all parts of the United States, R. G. Leland makes the following observations: The median gross incomes for the entire group reporting lies in the range \$6,500-\$7,499. It appears that the largest annual gross incomes are being made by physicians who have had ten or more years of preparation. The low gross incomes fall among those physicians who have had three years or less of preparation. The peak of gross income seems to be reached somewhere in the period of fifteen to nineteen years in practice. The gross annual income for the period of five to nine years in practice and the long period of thirty-five to forty-nine years in practice appear to be closely parallel. Although the high average annual incomes for the entire group appears to be reached in the metropolitan areas of 1,000,000 and more population, the low gross averages fall in communities of 2,500 and less population. Orthopaedic surgery, although furnishing only thirty-six reports, seems to be

the most lucrative type of special practice for those physicians reporting gross incomes of \$30,500 and less. For the entire group, the highest average annual gross income shifts to surgery. The lowest average for both groups is found in public health. Physicians in public health are principally on a salary basis and therefore the low position which they occupy in the income list is, in a measure, due to the fact that the list involves the comparison of gross incomes for many other physicians with principally net incomes for those in public health. The largest number of salaried physicians among those reporting for this study have had seven years or more of preparation. In the 6,328 reports studied, the percentage of physicians who derive all or most of their income from salary is largest in the population groups 10,000-25,000 and 500,000-1,000,000. Both the median and the average income of physicians whose income is derived wholly or for the most part from salary is found in the interval \$4,500-\$5,499; less than 4 per cent of the 853 physicians in the salary or primarily net income classification received more than \$12,500 in 1928. About 25 per cent reported income more than \$6,500; about 25 per cent reported income less than \$3,500. An estimated average net income of \$5,250 for general practice is based on the average gross income of \$7,781 derived in this study.—*J. Am. M. Ass.*, 1931, 96: 1683.

Metaphorically Speaking

According to the report, an escaped convict, recaptured recently said to the police: "I am hungry and fed up"; and probably neither he nor the policemen were just then aware that they had witnessed a small but definite event in the history of the English language. Hungry and fed up—it is impossible to be both at once, if the words are taken literally; and never before, perhaps, has there been so sharp an instance of self-contradiction. Yet the speaker meant something comprehensible, and the hearers are more likely to have understood his meaning at once than to have seen the irreconcilable contradiction in the words. And suppose that he had desired to be more emphatic, and had said "I am hungry and literally fed up," how many readers of the sentence in the newspapers would have seen anything wrong? Very few, we suspect; because "fed up" has long been losing any literal meaning it may once have had. Many a soldier wrote home from the front to say that he was fed up with the War, but that the food was very good. The time was sure to come when that phrase "fed up" would lose all association with material feeling; and come it apparently has.

The kinds and causes of change in language are many. One kind is suggested by the word

"literally," used above. Before long "literally" will only mean its true opposite, "metaphorically"—much as "prevent" has come to mean "obstruct" instead of "lead forward"—and when "littery gents" write of "a certain" this or that they nearly always mean an uncertain. But the history of "fed up" is the history of one among many metaphors that have become so common as no longer to suggest their origin and their literal meaning. Other examples are easy to find. "Where on earth have you dropped from?" That is, or used to be, a common expression; and few that used it would observe that they had spoiled a metaphor, because the original force of "dropped from" was to suggest some strange, far place—a cloud, a sunbeam, a star, anything so long as it was not "on earth." Some metaphors are so convenient that they become (to use one of them that is already a good deal distorted) catchwords; and even experienced writers may miss their force. In a very earnest article about humane slaughter it was stated not long ago that "those who advocate the abandonment of the pole-axe in favour of the humane killer had no axe to grind"; and of an athlete whose foot was amputated it was said that his career as a runner was cut short. This deadness to the origin and meaning of metaphors leads not only to the dusty jargon of politics—the ships of state, the unsheathed swords, the clouds on the horizon—but also to the exploration of avenues and other unusual proceedings to which politicians seem to be addicted. There is no use in being pedantic. The human mind cannot express itself without metaphor; and nearly every sentence spoken or written must contain at least one. For most people it is better to say that they are fed up, and get on with their work, than to spend time wondering how Dr. Johnson would have put it or hunting for other expressions, every one of which would probably turn out to be in origin metaphorical. But there are powers of preservation at work. One is undoubtedly the right sort of crossword puzzle (the wrong sort greatly increases the dulling of metaphor), which directs attention to the composition, history, and meaning of words. Another is those lovers of language, who do their best to stem the tide or put on the brake or hold the fort; those who are thoroughly fed up with all this abuse of metaphor (perhaps so fed up as to be utterly sick of it); and, even when they are as hungry as hunters and as cross as two sticks, had rather die than drop a brick.—*The Weekly Times*, Feb. 19, 1931.

The Order of St. John

No surviving institution connects the British Empire of to-day so closely with what we regard as the ages of chivalry as the historic Order of St. John of Jerusalem, the English branch of

which recently celebrated with fitting ceremonial the centenary of its revival. The "Grand Priory in the British Realm of the Venerable Order of the Hospital of St. John of Jerusalem" traces its ancestry back to the little hostel for Christian pilgrims created by Brother Gerard which Godfrey de Bouillon found in Jerusalem when he captured the Holy City in 1099. From this small beginning was developed a great Order of Chivalry pledged to defend the Christian faith and to serve the sick and poor, which eventually became a military power with all the attributes of sovereignty until it was so smashed to pieces by Napoleon that on the Continent it survives only as a highly exclusive body of Roman Catholic nobles of sixteen quarterings. For four centuries the Order occupied a splendid place in England with its great central Priory in Clerkenwell, the scanty remains of which now once more house it. At the Dissolution it suffered the fate of all other religious houses and it was not until 1831 that it was resuscitated, and not until 1888 that it was established by Charter as the Order of St. John of Jerusalem in England with Queen Victoria as hereditary Sovereign Head and Patron. How much the Order owes to the Royal Family is suggested by the presence at the centenary service in Westminster Abbey last week of nearly a dozen members of the House of Windsor, with the Duke of Connaught, the Grand Prior, at their head. At that service the Archbishop of Canterbury preached a sermon which was accorded the distinction of being broadcast throughout the world. The Order is associated in the minds of most people chiefly with the work of the St. John Ambulance Association, which, starting as a teaching body in 1878, developed a decade later into the St. John Ambulance Brigade. The activities of the Brigade in the war, associated with those of the Red Cross, can never be forgotten, and in peace its 70,000 members of both sexes are almost daily doing invaluable work in street and home here and in the Dominions. Almost half a century ago the Order renewed its immediate connection with Jerusalem by opening the Ophthalmic Hospital on "an impressive site overlooking the Temple" (to use the Primate's words), and here works of mercy are freely extended to men and women of all races and beliefs.—*The Lancet*, 1931, 2: 29.

The R.A.M.C. Shortage*

The letter in the *Times* of Friday last on the shortage of officers in the Royal Army Medical Corps, signed by two lieut.-generals, six major-generals, and two colonels of the Corps, should carry a weight alike with public and official opinion which no other form of representation could approach. These officers are all retired,

* From a correspondent in *Truth*, 1931, 110: 250.

they can have no idea of personal gain from their recommendations, and their sole concern is the very serious inadequacy of that Service for which they are so competent to speak. In giving publicity to their views, they admittedly have a double purpose—to reach public opinion, which is the final arbiter of official action, and to point the road to the Committee of Inquiry lately appointed by the Prime Minister to investigate the causes of the medical shortage in all the fighting services. Their conclusions, by the way, should apply equally to the same problem in the Royal Navy and the Royal Air Force.

I take it that this notable letter will have been read by all who have a direct interest in the subject, and, in any case, regular readers of *Truth* will be pretty familiar with the general arguments advanced. The one point I would particularly stress is the statement that "in no one instance in previous times has the position in the medical service been more serious than at present." The last Army Estimates gave the establishment figures as 828 officers, and Mr. Shaw admitted a shortage of 173 on authorized numbers. Since then, further retirements have probably brought the deficiency up to 200 officers. We cannot differentiate between war strength and peace strength in the R.A.M.C. as in the case of the fighting units. If a regiment is short it merely suffers somewhat in its drill; if the R.A.M.C. is short the Army suffers in its health. There are 57,000 troops in India for whom 290 medical officers are allowed, and there are about 20,000 more scattered throughout the Dominions and the Colonies for whom 126 M.O.s are allowed. To these figures must be added the wives and children of the married soldiers.

The R.A.M.C. needs a steady annual influx of fifty officers, and it is not getting them. The trouble is that the shortage automatically increases the difficulty in remedying it, for the smaller numbers have to work harder, spend longer periods abroad, and generally contribute to making the service still less attractive. The obvious remedy appears to be the real one, and this lies with the three P.s—pay, prospects, pensions. The proposal of the Committee on Economy to curtail the emoluments of panel doctors, should it be "implemented," may ultimately prove of advantage to the R.A.M.C., but we can neither count upon nor wait for this. The crux of the whole matter is that young qualified medical practitioners think they can do better in civil life than in the fighting services, and probably they are right. The distinguished batch of correspondents to the *Times* urge upon the Prime Minister's Committee to consider "an immediate improvement in the pay and pension and improvement in the status of all officer ranks of the R.A.M.C." in the light of the recommendations of the Committee of the British Medical Association which investigated the conditions of service in the Army earlier in the year. This is wise advice, as the B.M.A. naturally "cuts ice" with young medical men, and its

whole-hearted co-operation in any proposals is eminently desirable. The time has come when something must be done, and done quickly, and the ten officers who have given their unanimous views on what ought to be done, and the reasons why, are deserving of national gratitude. I am glad they refer to "the breakdowns, scandals, and sufferings of so many of our past campaigns," for, as one who was in the Dardanelles shambles, I was forced to poignant realization of the misery of medical officers so fearfully overwhelmed by the terrible harvest of the stretcher-bearers.

Abstracts from Current Literature

MEDICINE

Present Status of the Classification, Pathology and Etiology of Chronic Rheumatic Disease.

Miller, J. L., *Am. J. M. Sci.*, 1931, 182: 157.

Miller points out that it is now generally agreed by English, German and French writers that chronic rheumatic disease may be divided into two main groups which are readily distinguishable from each other on pathological and clinical grounds. The two English terms recommended are rheumatoid arthritis, (infective peri-arthritis) and osteoarthritis. Atrophic arthritis, chronic infective arthritis, and arthritis deformans are terms which in the past have been used synonymously with rheumatoid arthritis. Hypertrophic arthritis is synonymous with osteoarthritis. Both types may occur at the same time in the same patient.

Miller points out that the evidence in favour of an inflammatory basis for the disease is considerable. It resembles an inflammatory process pathologically. The bacteriological studies of Rosenow and others have incriminated the streptococcus, though there is no unanimity of opinion as to any specific strain. Most cultures have yielded a non-hæmolytic variety. Clinically, the disease usually presents the characteristics of an inflammatory process, namely fever and leucocytosis. This is especially evident when the disease occurs in children (Still's disease).

The pathological changes in osteoarthritis are in striking contrast to those in rheumatoid arthritis. The earliest lesion in this disease is a fibrillation of the cartilage, that is, a fibrosis of the normal cartilaginous striæ, resulting in ridging of the cartilage and vertical cracking. This process is considered to be due to poor vascularity. Following the cracking the cartilage degenerates and new bone takes its place. This process may go on for years in the central portion of the cartilage before the periphery degenerates. Eventually, the periphery is replaced by new bone and lipping

results. After lipping has appeared the process may involve the synovium when villous hypertrophy occurs, thus explaining the crunching sound in a joint often elicited clinically. Miller subscribes to the view that osteoarthritis is a physiological response to some form of irritation, either mechanical or chemical. Trauma, in the broad sense of the word, is the chief, if not the sole, etiological factor. He points out that in football players the process is in the knees, in boxers in the elbows and wrists, and in baseball pitchers in the shoulder. The Charcot joint is an osteoarthritis which results from the hypermobility and absence of pain sense in the joint. Because the process is non-inflammatory the author suggests the term "osteoarthrosis" as an improvement on the word "osteoarthritis", which implies inflammation.

Mixed types of chronic arthritis are not uncommon and are difficult to classify. It is probable that in these cases both etiological factors, namely inflammatory foci and trauma, are contributory to the deformity of the joint.

E. S. MILLS

Ventricular Fibrillation with Cardiac Recovery, Caused by Carotid Sinus Pressure, in a Case of Auricular Fibrillation. Shookhoff, C., *Am. Heart J.*, 1931, 6: 758.

A case of ventricular fibrillation caused by a carotid sinus pressure test with cardiac recovery is reported in this article. It has been shown, chiefly by Hering, that pressure upon or pressure within the carotid sinus causes a reflex vagal stimulation with a consequent slowing of the heart rate and a fall in systemic blood pressure. In auricular fibrillation, despite the fact that the sinus is not the pacemaker, it has been shown that vagus stimulation slows the ventricular rate. A review of the literature as given in this article seems according to the author to justify the impression that while the normal ventricular musculature appears not to respond to vagal stimulation diseased ventricular musculature, produced by whatever cause, does respond to such stimulation by all sorts of ectopic idio-ventricular rhythms, and also damage of ventricular musculature increases the irritability of the vagus.

The case reported had had migraine and extra-systoles for years and had developed a myofibrosis cordis with auricular fibrillation and a slow ventricular rate. With these underlying factors present it is believed that carotid sinus pressure stimulating a vagal system made hyperirritable by diseased ventricular musculature caused the aborted ventricular fibrillation.

W. H. HATFIELD

Digitalis Dosage in Auricular Fibrillation. Boas, E. P., *Am. Heart J.*, 1931, 6: 788.

The object of this paper is to show the great variance in the dosage of digitalis with an attempt at a more adequate explanation of the varying degree of tolerance. It is believed that the more improved standardization of the drug has led to too rigid a routine in its employment and to too implicit a reliance on the dose as theoretically worked out. It is pointed out that the dosage of digitalis necessary to achieve a certain effect depends as much on the vagus accelerator balance as upon the body weight and patients with different nervous constituents react differently to identical doses of digitalis. In patients in whom sympathetic activity is dominant larger doses are required to slow the ventricles and these larger doses are tolerated without toxic symptoms. In childhood neurocirculatory asthenia, Graves' disease and with severe circulatory failure the influence of the accelerator nerves outweighs that of the vagus, so that larger doses are necessary. Generally speaking, it is found that the effectiveness of digitalis medication in patients with auricular fibrillation parallels the degree of ventricular slowing they exhibit following pressure on the carotid sinus. In treating patients with auricular fibrillation the lability of the ventricular rate is as significant as its absolute level. Enough digitalis must be given to maintain ventricular slowing when the patient is pursuing his ordinary activities. Preponderant accelerator activity manifests itself clinically by a rapid labile ventricular rate. For practical purposes the author gives as an initial dose 0.18 c.c. of the tincture per pound. At the end of six hours 4 c.c. are given and repeated again in six hours. Then 2 c.c. every six hours until the ventricular rate is about 60 at rest. The size of the maintenance dose will vary between 1 c.c. and 5 c.c. of the tincture daily. In conclusion, the author states that strict individualization and the giving enough of the drug to produce the desired effect irrespective of the size of the dose are the essence of successful therapy.

W. H. HATFIELD

Tuberculosis Simulating Acute Leukæmia. Marzullo, E. L. and de Veer, J. A., *Am. J. M. Sci.*, 1931, 182: 372.

Marzullo and de Veer present two cases of tuberculous infection, one pulmonary, the other generalized, with a myeloleukæmoid blood picture and a clinical course simulating acute myeloid leukæmia. The first case reported was a young woman of thirty who entered the hospital because of vaginal bleeding. There was clinical evidence of bilateral apical tuberculosis. The initial blood count showed a

moderately severe anæmia with 7,000 leucocytes, of which only 2 per cent were mature polymorphonuclears. Eighty-six per cent of the leucocytes were classified as myelocytes. Of these 20 per cent were oxydase-positive and 53 per cent were oxydase-negative. The patient died after a short illness and autopsy revealed no leukæmic infiltration. The second case was a male of thirty years who had generalized tuberculosis. The blood picture differed from the first case reported in that there were 5,700 leucocytes and 39 per cent of these were mature polymorphonuclears. Autopsy revealed no leukæmic infiltration. The authors conclude that tuberculosis may so affect the hæmopoietic tissues as to give rise to a myeloid leukæmic blood picture.

E. S. MILLS

The Possible Clinical Indications for Follicular Hormone Therapy Based Upon its Known Biologic Effect in Animal Experiments.

Schoeller, W., Dohrn, Max and Hohlung, W., *Am. J. M. Sci.*, 1931, 182: 326.

These authors, writing from Berlin, are among those who subscribe to the belief that the female sexual cycle is controlled by the interaction of the hormones of the anterior pituitary and of the ovaries. Under the influence of the anterior pituitary the ovaries, even of infantile animals, will produce a hormone which will cause maturation of the female genital organs and of the secondary sexual characteristics, both physical and psychological. This hormone is produced in large quantities at the time of maturation of the Graafian follicles; hence it is called the "follicular hormone". After sexual maturity is complete there is no further need for the follicular hormone and it is no longer produced. However, in order that the fertilized ovum may become implanted in the uterus a second ovarian hormone is necessary. This decidua-forming hormone is produced by the corpus luteum and is in no way related to the follicular hormone.

The clinical applications of follicular hormone therapy are therefore clear-cut. It is indicated in all cases due to ovarian hypofunction, especially in the climacteric changes, producing rejuvenation even in elderly women in whom climacteric symptoms have already subsided. It is also indicated in menstrual disorders as secondary amenorrhœa, oligomenorrhœa and dysmenorrhœa. It is inadequate in cases of primary amenorrhœa due to complete absence of development of sexual organs, as there is consequently nothing to work on. It is of course not effective in amenorrhœa incident to advanced systemic disease such as phthisis or carcinoma.

E. S. MILLS

A Study of Five Hundred Diabetics. Sevringhans, E. L., *Am. J. M. Sci.*, 1931, 182: 311.

Sevringhans has studied the records of 500 diabetic patients admitted to the Wisconsin General Hospital during the eight years since insulin was made available. Of the 500 cases 60.4 per cent showed positive acetone tests at the time of admission and practically all of these (84.4 per cent) required insulin at discharge. There were 252 males and 248 females in the series. There was a history of pain in the extremities in 36 per cent, and reduced or absent patellar reflexes in 46 per cent of the cases. An analysis of 90 cases which died while under observation showed the cause of death to be due to coma in only eleven. Cardiovascular-renal disease occurred in 20, and carcinoma in 3. Sixteen cases died of pneumonia and only 4 of tuberculosis. Post-gangrene septicæmia accounted for fifteen. Septic processes of one type or another caused death in over half of the cases which died under observation.

E. S. MILLS

A Glycosuric Family Without Hyperglycæmia.

Weber, F. P., *The Lancet*, 1931, 2: 71.

In this interesting family the parents in the first generation were first cousins. Both had died of tuberculosis, and it was not known whether they had been glycosuric. Of their four children one only seemed to have been affected. She had been known to excrete sugar in the urine for a period of 44 years without developing any symptoms of diabetes. There was no polyuria, no thirst; the fasting blood sugar was 0.083 to 0.094. The specific gravity of the urine was 1040 and it contained 5 to 8 per cent of sugar. This woman married twice, having a normal daughter by the first man, and four affected children by the second. One son had almost 5 per cent of sugar in the urine, but there were no symptoms of hyperglycæmia, the blood sugar being less than 0.091. A daughter of 20 had over 4 per cent of sugar in the urine, with a normal sugar tolerance curve, and a fasting value of 0.089. A second son had a slight amount of sugar, with a normal sugar tolerance curve. The third son had 2.5 per cent sugar in the urine, with a fasting blood sugar of 0.084. The elder son had been diagnosed as a diabetic, and had been treated with insulin injections over a period of time, without its diminishing the sugar in the urine. None of the patients had diabetes, but Weber recalls that Hjærme, who investigated orthoglycæmic glycosuric families, found that occasionally diabetics were found among these persons.

MADGE THURLOW MACKLIN

SURGERY

Carcinoma of the Breast in the Young. Lee, B. J., *Arch. Surg.*, 1931, **23**: 85.

This contribution is a study of 303 patients at the Memorial Hospital, New York. They were all under forty years of age. The author and his associates have found that radical surgical intervention in young women affords poor end-results and that few survive the three-year period; the disease progresses more rapidly, even though there is a well localized lesion in the breast with no apparent involvement of the axillary nodes; recurrences occur earlier and there is usually a fatal termination. The problem of the present survey was to ascertain the exact end-results in this group as well as to determine some of the factors contributing to these results. The youngest patients in the series were two, aged 22 years. Three per cent were 25 or under this age. Two-thirds, or a total of 270 patients, had previously had lactating breasts.

The diagnosis of mammary carcinoma in young women is usually difficult. Fibroadenoma is not infrequently mistaken for carcinoma. What may be considered a simple fibroadenoma may be a true infiltrating carcinoma. In two patients abscess of the breast was diagnosed when a rapidly growing inflammatory carcinoma was actually present. In this type of breast cancer, an attempt to evacuate the abscess subjects the patient to additional hazard, owing to the danger of further dissemination of the disease.

Only one of the total 303 patients was a male, showing the rarity of breast cancer in men forty years of age or younger.

Twenty-six of the group were classified as of the acute inflammatory type, which is the most menacing and rapidly progressive form of breast cancer. The affected breast is definitely larger than normal with a distinct blush over it, resembling at times an acute infectious process. The tumour is usually palpable but poorly defined. The nipple is often oedematous and retracted. The axillary lymphatic nodes on the same side are involved early and are usually bulky. There may be slight tenderness over the breast and the temperature beneath it may show a rise of from 1 to 1.5 degrees F. compared with that taken in the mouth. There is early invasion of the opposite breast and lymphatic nodes.

The author has not seen a case of inflammatory breast cancer in a young woman yield anything but disastrous results from any attempt of a radical operation. Irradiation is the only therapeutic measure which has a restraining influence. The case histories of 4 patients with this type of breast cancer are given. Sixty patients of the series had inoperable breast carcinoma when admitted to the hospital. Many of

these patients had reached the stage of inoperability a few months from the onset of symptoms. External irradiation was used, and there was little doubt but that there was material benefit from this method of treatment. Lee is of the opinion that breast cancer must be given adequate irradiation if a considerable degree of restraint of growth is to be obtained by this means. The shortest duration of life in these inoperable cases was two and a half months. The average duration of life for the 60 cases was one year and eleven months.

In 140 of the 303 cases the left breast was affected and in 158 the right. In 5 both breasts were involved. In 28 per cent the outer upper breast quadrant was the site of the primary disease. In 20 per cent the site was in the upper inner quadrant. In 17 per cent of the patients there was a diffuse thickening of the whole breast as the initial symptom. There were 243 primary operable cases; only 44 of these had a primary operable setting and a radical operation was performed at the Memorial Hospital. All of these received uniformly a pre-operative cycle of roentgen treatments as well as after operation. Thirty-two patients were referred to the clinic for post-operative radiation following radical amputations at other New York hospitals. There were 115 patients who had the radical amputation performed at other hospitals and came to the clinic with recurrences. Fifty-two operable patients came to the clinic following operations less extensive than radical amputation. Thirty-six per cent of the forty-four Memorial Hospital patients were well at the end of three years, while only 20 per cent of the second group and 7 per cent of the third group were alive and well at the end of this period.

Accounting for these results Lee believes that more carefully drawn lines for operability are drawn at the Memorial Hospital. There is also a most thorough scrutiny made of the patients. Pre-operative irradiation is of value especially if a period of from three to five weeks intervenes before the radical operation is performed. Post-operative irradiation when efficiently given is of service in preventing recurrence and in restraining the growth in tumour cells following operative intervention. Another factor influencing the three year end-results was axillary metastasis, which was present in forty-two out of sixty patients at the time of operation. Of that number only 10 per cent survived the three year period with no evidence of recurrence. Of the remaining 18 patients without axillary metastasis 67 per cent were alive and well three years following the radical operation. The presence of cancer of the breast with lactation is a menace to the patient. Therapeutic abortion is advised when pregnancy is present, before any operation for removal of the breast is undertaken. Of 191 operable cases there were

25 patients with existing lactating breasts, and mammary carcinoma. Only 8 per cent were alive and well three years after the radical breast operation. Where limited breast operations were performed the results were poor compared to similar cases where the radical operation had been performed. Such measures should be condemned when operation has to be undertaken for breast cancer in a young woman. Recurrences were noted in over 25 per cent of the 191 cases within the first three months. Of 143 patients available for tabulation of five-year end-results, only 10 per cent were alive and well at the end of this period. Histological studies were made in all of the 44 primary operable cases and in 28 of the 60 primary inoperable cases and the degrees of malignancy of the various types estimated.

G. E. LEARMONTH

OBSTETRICS AND GYNÆCOLOGY

Recognition and Treatment of Birth Injuries in the Newly Born. Fleming, G. B., *Brit. M. J.*, 1931, 2: 481.

The infant in its passage through the genital canal probably experiences more severe trauma than at any future stage of its existence. Infants show wonderful powers of resistance to injury, but little to sepsis. Once the first critical days have passed, if infection be avoided, most infants make a rapid and complete recovery from the trauma of birth. Of the deaths from birth injury 68 per cent occur in the first three days of life.

Injuries to skin and subcutaneous tissue include caput succedaneum, œdema of the lips in face presentation and of genitalia in breech presentation, bruising of the scalp from forceps or from pressure on the promontory, cephal-hæmatoma, adipo-necrosis and Bednar's ulcer. Deformity of the sternomastoid muscle is probably due to venous obstruction and ischæmic contracture. In fracture of the skull surgical intervention should as a rule be avoided.

In Erb's paralysis the arm should be fixed in a position of abduction and external rotation with the forearm flexed at a right angle. The results are almost always excellent. Fracture of the femur is best treated by vertical extension with the thigh at a right angle. Facial paralysis almost always passes off in 1 to 2 weeks. In brachial paralysis two principal forms are recognized, the Erb-Duchenne type, in which the 5th and 6th cervical roots or their trunk are damaged, and Klumpke's type, in which the 7th and 8th cervical and first dorsal roots are involved. In the former the muscles most commonly affected are the deltoid, the supra- and infra-spinatus, the teres minor, the biceps, the brachialis anticus and the supinator

longus; in the latter, the triceps and practically all the muscles of the forearm and hand, except the supinator longus. A positive "embrace reflex" differentiates paralysis of the upper neurone type caused by cerebral lesions from lower motor neurone lesions as in peripheral nerve injuries. Injury to the spinal cord is commonly produced during breech extraction.

Intracranial hæmorrhage is extremely common. Unfortunately, it is exceedingly difficult to diagnose it with certainty during life. A definitely pigmented or uniformly blood-stained cerebrospinal fluid, with crenated red cells, is probably the most important manifestation available. Even this sign does not afford absolute proof. Careful and skilled nursing is essential. If there are signs of increased intracranial pressure lumbar puncture is of use. Convulsions should be prevented by I grain doses of chloral q. 2. h.—Sequelæ are mental deficiency, asymmetrical spastic paralyses and hydrocephalus.

The points emphasized in the recognition and treatment of birth injuries are: (1) the prevention of sepsis in even the smallest superficial abrasion; (2) the recognition and treatment of fractures; (3) the recognition and early treatment of injuries to nerves; (4) the careful nursing of the infant with intracranial damage.

ROSS MITCHELL

Breech Presentation: Fœtal Mortality and Injuries. Gibbard, G. F., *Brit. M. J.*, 1931, 2: 369.

Breech labour itself—setting aside all associated complications—is responsible for a fetal mortality of not less than 28 per cent in primiparæ and 15 per cent in multiparæ. Apart from the associated accidents, such as prolapsed cord, the intranatal deaths are due largely to two causes. These are intracranial hæmorrhage, which, according to Holland, accounts for 75 per cent of fetal deaths, and asphyxia following cord compression after the birth of the buttocks. Gibbard does not agree that death results from drowning due to premature inspiration.

Apart from the danger of death, the fetus in breech cases runs an increased risk of serious injury, which in the cases analyzed occurred in 5 per cent of children born living. Minor degrees of intracranial hæmorrhage and of tentorial tears are not necessarily incompatible with life. At the present time it is very difficult to form an opinion as to the late results of these injuries. Apart from post-mortem evidence, there is no way of being certain of the diagnosis of intracranial injury in the newborn. Injuries to abdominal viscera should not occur even in the most difficult breech extractions provided reasonable care in handling the fetus is exercised. Injuries to the upper limb

are by far the commonest injury in difficult breech cases, and are nearly always the result of manipulations to extended arms. The cause of limitation in the movements of the arm is nearly always either an Erb's paralysis or a fracture of the upper end of the shaft of the humerus. A fractured clavicle is often noticed only when callus has formed at the site of fracture. Injuries to the lower limb are very much less common. Early diagnosis of injuries to the limbs is all-important, since early treatment is usually rewarded by excellent recovery.

ROSS MITCHELL

Probable Tubal Origin of Endometriosis. Everett, H. S., *Am. J. Obst. & Gyn.*, 1931, 22: 1.

Operative trauma is not necessary for the production of an adenomatous process in the uterine cornu or tubal isthmus. Such adenomatous processes do not necessarily result from inflammation. The tissues involved in such an adenomatous process may be either tubal mucosa, or endometrium, or both, in one and the same case. There is evidence to suggest that in some cases in which endometrium is present it may arise from tubal epithelium by metaplasia. Many lesions diagnosed as endometriosis are really collections of cystic spaces lined by tubal epithelium. In some cases of ovarian and pelvic endometriosis real endometrium and spaces lined by tubal epithelium occur simultaneously, again suggesting the possibility of metaplasia.

ROSS MITCHELL

A Case of Central Node Carcinoma of the Cervix. Moore, M. R., *Bull. of the William W. Backus Hosp.*, 1931, 1: No. 1.

The patient, 46 years of age, was brought to the hospital in extreme prostration, complaining of abdominal pain and orthopnea, very ill. She had had a foul vaginal discharge for some time; 48 hours before admission a severe chill followed by pain, headache and vomiting set in.

On physical examination, the patient was obviously seriously ill with a temperature of 104°, pulse 120. The positive physical findings were: diminished resonance over the right lower lobe with numerous râles; a palpable liver; generalized tenderness of the whole abdomen; a large, patulous, gangrenous cervix. She was given bichloride of mercury douches every eight hours, with digitalis, and kept in Fowler's position. Chills continued, and two days later the respirations became very rapid and laboured; progressive weakness and finally death.

The post-mortem examination showed pulmonary embolism, toxic changes in liver, spleen and kidneys, hydronephrosis of right kidney, pelvic peritonitis, and a mass involving the

cervix and base of the bladder. This mass on microscopic section showed a fibrous stroma with epithelial-like cells which varied in size and showed numerous mitotic figures. Within the cancer tissue, many small abscesses were formed.

This is a type of carcinoma of the cervix believed to originate from fetal remains, which spreads rapidly and causes few symptoms. It is usually inoperable when discovered.

This patient died of an infected carcinoma of the cervix, from which septic emboli were shed which lodged in the lung capillaries and were the immediate cause of death.

ELEANOR PERCIVAL

OPHTHALMOLOGY

Obliterating Cautery Puncture in Detached Retina. Gonin, J., *Ann. d'Oculistique*, 1931, 168: 1.

Gonin begins his article with a short history of his operation with which he first corrected a case of spontaneous retinal detachment by thermocauterization in 1916. He reported cases from year to year up to May, 1930, when he published a report on 240 cases of spontaneous retinal detachment, the majority of which were treated by operation. He emphasizes the constancy of retinal tears and the rôle they play in the detachment, and also that one must obtain at the earliest possible moment a cessation of the outflow of vitreous which, forming the retroretinal effusion, maintains the detachment.

In his examination of the eye, Gonin obtains maximum mydriasis from cocaine and homatropine and uses the indirect method with the ophthalmoscope. He directs his examination first to the section of the retina which corresponds to the defect in the visual field complained of by the patient. He emphasizes, however, that there may be other tears or holds in totally different areas. The appearance of the fundus as regards the appearance of the tears, their position, etc., is accurately drawn on a chart. When the possibility of operation has been established, it is necessary then to mark on the external surface of the eye the meridian and parallels corresponding to the tear, that is, the direction and the distance calculated from the border of the cornea to the point in the sclera where the cautery puncture is to be made. This marking on the globe, which is indispensable, is done by Gonin with a solution of alcohol and gentian violet retouched with China ink. The direction of the tear having been indicated, it is now necessary to establish the distance from the tear to the ora serrata.

S. HANFORD MCKEE

The Relation Between Phlyctenular Keratoconjunctivitis and Tuberculosis. Towbin, B. G. and Rawie-Scerbo, W. A., *Arch. F. Ophth.*, 1930, 124: 154.

In thirty cases of phlyctenular diseases of the eye, general physical observations were made, and the reactions to parenteral injections of milk. A Pirquet test was done with dilutions of old tuberculin: 1, 3, 10, 30 and 100 per cent. All the patients were sensitive to tuberculin. No relation was made out between the type of observations of the chest; and the eye disease. The Pirquet test was of the exudative type in 20 of the 30 cases. The other 10 cases showed the hyperæmic infiltrative reaction. Focal reactions were observed after the injections of milk in one case, and after the Pirquet test in fourteen. In the 14, the Pirquet showed an exudative reaction. From these observations it is established that high sensitiveness of the eye to tuberculin expresses itself in a peculiar skin reaction. The sensitiveness of the eye to tuberculin was parallel with the sensitiveness of the entire body to the same virus. The recurrences of the phlyctenular disease represent reactions of the sensitized organs to the tuberculin, which are produced by lesions of the chest or intestine.

S. HANFORD MCKEE

NEUROLOGY AND PSYCHIATRY

Epilepsy, and Gunshot Wounds of the Head. Stevenson, W. E., *Brain*, 1931, 4: 214.

Statistics on the incidence of epilepsy following head wounds vary greatly. In various series figures from 4½ to 25 per cent are cited, but the author, from an extensive experience on Board of Pensions work, concludes that the former figure, that of Sargent, is still a fairly accurate estimate. He points out that, contrary to a commonly held belief, the convulsive disorder may appear ten years or more after the injury. The persistence of vertigo in the intervening interval suggests that it is an epileptic symptom. Another frequent "interval" phenomenon is loss of emotional control. Epileptic equivalents in the form of emotional outbursts, wandering, periodic depressions, dream states, etc., are not so frequent as in idiopathic epilepsy. Jacksonian epilepsy in the true sense is not frequent, although some cases gave a history of such attacks intervening shortly after the injury and either ceasing or being replaced by general epilepsy later. Mental deterioration seems to be dependent upon the frequency of the attacks and the severity of the original injury.

The site of injury appears to influence the clinical picture very definitely. Where the injury was *frontal* the fits were infrequent and appeared long after the injury; aura was lack-

ing, memory impaired and a peculiar alteration of emotional tone noted. The occurrence of an aura should lead to a search for an additional area of trauma. In trauma involving the *motor cortex* a motor aura is usual but is often of very short duration. The attacks appear sooner after injury, are major in type, and generally increase in frequency. Mental deterioration is common and various degrees of paresis almost invariable. In injuries *posterior to the motor cortex* infrequency of fits is noticeable and periodic unreasonable emotional outbursts fairly frequent; auræ are infrequent but if they occur are likely to be either visual or auditory. In injuries of the *temporal lobe* combinations of major and minor attacks, gustatory auræ and mental deterioration were noted. In cases in which seizures appear following superficial wounds the "epileptic predisposition" or "nervous instability" is believed to play a larger part than the injury.

A. T. MATHERS

Eye Paralysis in Diphtheria. Shaw, M., *Guy's Hosp. Rep.*, 1931, 81: 247.

Diphtheritic affections of the eye are exceedingly variable in their manifestations and are often precursors of even more serious complications. The great majority are due to the effects of circulating toxin, the degree of involvement depending upon individual susceptibility and the intensity of the original infection. The first of these factors is apparently of considerably greater importance than we have credited it with. Some patients go on to the development of eye palsies in spite of the early and adequate use of antitoxin. It is important to remember that complications may occur in diphtheria, no matter what the site of the initial infection. The onset of an otherwise unexplained paralysis of accommodation should lead to a careful search of the history for an unrecognized attack of diphtheria—faucial or otherwise. Next to the knee jerk, the neuromuscular mechanisms of the eye are the most readily affected by diphtheria toxin, and their occurrence should warn one of the possibility of more serious complications affecting the heart, diaphragm or pharynx. There is still uncertainty as to whether the cause of the palsy is central, peripheral, or both. The more frequent lateralization of the ocular disturbance to the side corresponding with the initial throat involvement suggests a lymphogenous conduction of the toxin. Hæmatogenous conduction does occur in many cases, of course.

The onset is generally in the third or fourth week and paralysis of accommodation the earliest and most frequent ocular manifestation. External ophthalmoplegia, evidenced by diplopia, is not so frequent, occurring in approximately 3 per cent of the patients. Occasionally there is

complete oculomotor paralysis. Treatment of the diphtheria by antitoxin at the stage of paralysis is valueless, and, with few exceptions, the prognosis is good.

A. T. MATHERS

The Dehydration Method in Epilepsy. Cameron, D. E., *Am. J. Psychiatry*, 1931, 11: 123.

We have here reported an investigation undertaken at the Manitoba Hospital, Brandon, to test the validity of Temple Fay's claims for the treatment he advocates. Reference was made to Fay's theories in these columns a few months ago. Briefly, he believes that the subarachnoid villi are concerned in the absorption of cerebrospinal fluid; that if they fail in this function an excessive accumulation of fluid occurs and is productive of convulsive seizures; and that limitation of fluid intake (dehydration), by lessening demands on the villi, aids in breaking a vicious circle, and controls such seizures. Cameron's patients had all had fits for several years, and as they were all more or less mentally deteriorated, they did not cooperate consistently—a factor to be considered in the interpretation of his findings. It was not found feasible to construct a diet of adequate caloric value if the ultimate water yield were less than 600 c.c. To this water was added as necessitated by serious loss of weight, acidosis or nitrogen retention. The effect on the number of fits was unsatisfactory and inconstant. After several months of dehydration, the diet was abruptly abandoned and fluids were not restricted, but the amounts of fluid taken were recorded. Again the results were inconstant and unsatisfactory. Equally variable results were obtained in a group of patients, not previously dehydrated, in whom fluids were pushed to 2,500 c.c. daily. Cameron concludes that Fay's treatment is of little value in the treatment of typical institutional epileptics, and that the effect on some patients was injurious.

W. H. HATTIE

Gastro-Intestinal Motor Functions in Manic-Depression Psychoses. Henry, G. W., *Am. J. Psychiatry*, 1931, 11: 19.

Roentgenological observations of 96 cases of manic-depressive psychosis point to a definite relationship between the emotional state and gastro-intestinal motor function. Painful emotional stimuli behave "as if there was a predominant inhibiting action of the sympathetic division of the vegetative nervous system. On the other hand, when the stimuli are pleasant it behaves as though there was a predominant action of the autonomic division with a consequent acceleration of nutritive metabolic processes". In the manic phase the viscera are situated from an inch to two inches higher than in the depressive phases; hypomanic patients

present a marked increase in visceral tension and motility, but in definitely manic cases visceral function has reached the limit of acceleration and begins to be retarded. Depressed patients present a marked decrease in visceral tension and motility. While the average time required for a hypomanic patient to evacuate a barium meal is 47 hours, 68 per cent of depressed patients retain barium or food residue over a period of more than five days, when, as a longer period of retention cannot be permitted, purgation must be resorted to, so the time required for natural evacuation cannot be determined. Despite such gross change in the function of the gastro-intestinal tract, normal function returns with recovery from the psychotic condition.

W. H. HATTIE

HYGIENE AND PUBLIC HEALTH

A Study of Epidemic Catarrhal Jaundice.

Fraser, R., *Can. Pub. Health J.*, 1931, 22: 396.

This communication records that 173 cases of catarrhal jaundice developed early last winter at Mount Allison University, Sackville, N.B. The jaundice followed quickly upon an epidemic of gastro-enteritis which involved about 600 out of a total of 620 students in residence. In only one case of jaundice was there no history of a previous gastro-enteritis. The gastro-enteritis affected only those who drank water from a spring, which was being used temporarily because the water from the civic supply had been rendered unpleasant by enlargement operations at the reservoir. Fraser's very thorough investigation eliminates any other source of infection. Although *B. coli* were found in large numbers in the town water, the townsfolk and the students who used it were not affected.

The striking features of the report are that almost 100 per cent of those who drank the spring water came down with gastro-enteritis, and of those so affected 27.9 per cent subsequently developed jaundice. It is notable that the spring water was not subjected to laboratory examination before being brought into use.

Examination of a number of rats, a few of which were found on the college premises, but most of which were obtained in the town and surrounding country, failed to discover *Leptospira icterohæmorrhagiæ*. Agglutination tests showed no specific agglutination and no lysis, either with a standard culture of *L. icterohæmorrhagiæ* or with leptospiræ or other bacteria isolated from the water. Sera from a number of cases convalescent from or recovered from icterus, when tested with suspensions of *S. schottmülleri*, regularly produced agglutination in dilutions of 1-640. Several of these sera agglutinated *S. paratyphi*, but this was found to be a group agglutination and Fraser con-

cludes that *S. schottmülleri* was the antigenic organism.

Despite elaborate bacteriological examination of the spring water, Fraser did not succeed in isolating from it any organism known to be pathogenic. The only organism of possible pathogenic significance was *Cl. welchii*. This was found in large numbers, but Fraser is not prepared to speak definitely as to its significance. Experimental studies are still in progress. When these are completed the findings will be published.

W. H. HATTIE

BCG Vaccine. Rankin, A. C., *Canad. Pub. Health J.*, 1931, 22: 459.

In this paper Rankin reviews interestingly the experience of the Alberta Committee on Tuberculosis Research with the BCG vaccine, and comments restrainedly on the divergent views relative to the vaccine that have been expressed in various quarters. He asks and answers three questions. (1) Will the organism revert to virulence in culture and in the tissues? There is still confusion owing to the uncertainty of the methods, cultural and other, employed. Reversion to virulence is seemingly due to dissociation. The Alberta experiments, carefully conducted and rigidly controlled, led Rankin and his associates to conclude that there is no evidence proving that the organism, grown according to Calmette's methods, and used for vaccination as recommended in the natural (bovine) host, will dissociate or produce progressive lesions. "This being so, it is perhaps quite reasonable to assume, on the experimental evidence and the statistics available, that it is non-virulent for the other species of animals, including man, which are not so susceptible to bovine infection." (2) Does the vaccine produce a resistance of sufficiently high grade to be of use in the control of tuberculosis, and, incidentally, how long will this resistance be effective? Again varying results have been reported. The Alberta results indicate that the vaccine produces definite resistance in bovine animals, and statistical evidence from other sources indicates its value as a prophylactic in new-born children. Time will tell how long the protection thus afforded will last. (3) Will BCG vaccine tend to the production of carriers? "The true 'carrier' problem, where vaccination has been carried out according to Calmette's methods, must be intimately associated with the possibilities of dissociation, or the return to virulence of BCG in the tissues, and is not a matter, so to speak, of virulent tubercle bacilli from natural or other source in vaccinated animals, any more than such might be the case in naturally infected non-vaccinated animals." Unprotected animals, kept in most intimate

association with mouth-vaccinated animals, suffered no ill effect in the Alberta experiments.

W. H. HATTIE

Etiology of Acute Intestinal Intoxication in Infants and Children. Johnston, M. S., Brown, A. and Kaake, M. J., *Canad. Pub. Health J.*, 1931, 22: 441.

In a continuation of previously reported studies, the authors investigated the illnesses of 67 infants in the summer and autumn of 1930, and record their results in this communication. All infants had been bottle-fed or had been on suitable soft diet. Their illnesses had been variously diagnosed as acute intestinal intoxication, infectious diarrhoea, fermentative diarrhoea, dysentery, etc. No essential differences were found in the character of the stools in the cases thus variously diagnosed, and the same is to be said of the bacteriological findings. The predominating organisms were *B. Schmitzii*, *B. dysenteriae* Flexner, and *B. dysenteriae* Sonne, while *B. paratyphosus*, *B. asiaticus*, *B. dispar* (?) and other organisms were found less frequently. In several cases no significant organisms were discovered, but 63 per cent of the cases investigated yielded definitely pathogenic organisms of which the majority were dysentery strains. The evidence supports the hypothesis "that acute intestinal intoxication, infectious diarrhoea, and dysentery present one clinical picture and are confusing descriptive terms applied to one condition—an infection of the gastro-intestinal system, the causative organism in the majority of cases belonging to the typhoid dysentery group. The evidence shows, too, that cases of so-called fermentative diarrhoea may be in reality infections of the same type".

A group of 29 children of ages two to ten years was also studied. In this group the *B. dysenteriae* Sonne was strongly predominant, and there was not the mixture of organisms, in individual cases, which characterized the infant group.

The carrier state of dysentery infection, in both infants and adults was demonstrated by the study, and flies were shown to be possible vectors of infection.

W. H. HATTIE

THERAPEUTICS

Metal Therapy in Tuberculosis. Cummins, S. L., *Bull. Hyg.*, 1931, 6: 455.

In this summary of a long series of contributions, Cummins states that there appears to be no longer any question that gold therapy in general, and sanocrysin therapy in particular, has established a definite place in the treatment of tuberculosis, especially when collapse treatment is inadmissible. Patients at first unsuited to artificial pneumothorax, phrenic avulsion or thoracoplasty may, through sanocrysin

treatment, be raised to a level at which collapse treatment is well tolerated and successful. There are still, however, sharp differences of opinion as to dosage, the intervals between doses, and the type of case to be selected, but Cummins believes that the disagreement is more apparent than real, and is dependent upon differences of policy and differences of interpretation of nomenclature rather than upon more fundamental factors. In respect of dosage there are two main schools; that of Secher, who advocates large doses rapidly repeated, and that of Permin, who favours smaller doses at longer intervals. Seemingly, Permin has the larger following. With reference to choice of gold salts, Henius is quoted as considering the relatively more toxic preparations krysolgan, triphal, and aurophos to be especially indicated in chronic tuberculous processes, while the less toxic preparations, lopion, solganol and sanoecrysin, are more suitable in the acute and "exudative" types. Unfortunate results are still being reported, but, in the opinion of Cummins, much less frequently than in the earlier days of sanoecrysin.

Walbum's investigations of the action of rare earth metals in tuberculosis offer hope that important results may be expected, although in his research into the effects of 42 different metals on the experimental tuberculosis of rabbits he obtained "cures" with only two—cadmium and manganese. Partially favourable results were obtained with cerium, barium, aluminium, lanthanum, molybdenum, platinum, nickel and samarium, while the remaining 32 were without effect. Lunde, applying Walbum's methods to the treatment of tuberculosis in man, secured results which "are of great interest and hold out considerable hope of success".

W. H. HATTIE

THE PLACE OF ALUMINIUM, COPPER, MANGANESE, AND ZINC IN NORMAL NUTRITION.—There is abundant evidence of the occurrence of aluminium in small amounts in food and normal tissues, but not definite evidence of any specific function for that metal. Copper is widely distributed in plant and animal tissues; it is a definite constituent of the liver, and must be regarded as important in iron metabolism. Manganese occurs in most living plant and animal tissue, but evidence of any specific function in animals is meagre. Zinc is also widely distributed; there is some evidence, in the case of the mouse, that it may have a specific function. It is noted that quantities of metals not tolerated if given in a single dose without food or drink, may be borne if administered mixed with the day's food.—M. S. Rose, *J. Nutrition*, 1: 541.

Obituaries

Dr. David Young, a pioneer medical man of Manitoba since 1871, and the first superintendent of the Manitoba Mental Hospital at Selkirk from 1886 to 1912, died at Winnipeg on October 16th.

He was born at Sarnia, Ont., in 1847, graduated in medicine from Queen's University in 1871, and immediately came west to the newly created province of Manitoba. He built his home near St. Andrew's Rapids on the Red River and practised along the river from Winnipeg to Lake Winnipeg. The trials and privations incident to a new settlement caused many mental breakdowns among the new settlers and provision had to be made for these unfortunates. Temporary quarters were found first at Lower Fort Garry; then in 1886 the hospital at Selkirk was opened, with Doctor Young as superintendent. A thorough gentleman, courteous in manner and well skilled in his profession, he did much in establishing an institution that is widely known for its humane and scientific care of mental patients. His memory in the Red River district will long be cherished by those who admired his professional ability and his cheeriness of manner.

ROSS MITCHELL

Dr. John S. Bentley. It is with much regret that we record the death, recently, of Dr. John S. Bentley, of Saint John. Doctor Bentley was born in Saint John, graduated from Dalhousie University with a B.A. in honours in 1900, and obtained the degrees of M.D., C.M., from McGill University in 1904. That year, he entered the Saint John General Hospital as an interne and in 1905 commenced private practice in this city.

Doctor Bentley had held in turn the positions of President of the Saint John Medical Society, Secretary, and then President of the New Brunswick Medical Society, member of the Council of Physicians and Surgeons of New Brunswick, and subsequently President of that body. Later on, he was Registrar for the Council. Doctor Bentley served on the Medical Board of the General Public Hospital for several years as a senior physician. His activities in Masonry are well known. His friends throughout New Brunswick mourn the loss of a brilliant physician and an esteemed friend.

A. STANLEY KIRKLAND

Dr. Thomas Chisholm. After a brief illness from cardiac trouble, complicated by pneumonia, Dr. Thomas Chisholm, formerly of Wingham, Ont., died at his residence in Toronto on October 1, 1931, in his 90th year. He had made his home in Toronto since retiring from active practice.

Of Highland Scottish and Irish ancestry, he was born at Glenwilliams, Halton County, April 12, 1842, was educated in the local schools and for ten years taught in the public and high schools of Garafraxa township and of Fergus. Not satisfied with that form of activity, he took up the study of medicine at the University of Toronto, graduated in 1879, and, two years later, obtained his M.D. degree.

He commenced practice at Arthur, Ont., then went to Grand Valley, of which village he was regarded as the father, having laid it out and started its development. Later he settled in Wingham, where he was in practice for more than thirty years. He also was surgeon for both the old Grand Trunk and Canadian Pacific Railways. For a period he was a lecturer on pathology and medical jurisprudence at the Western University, London.

All his spare time was devoted to study and he was an author of no mean repute. Perhaps his greatest claim to literary fame was his *Rhyming History of England*, in which he condensed more than ten cen-

turies of history into 100 lines. Other works were: "Dialogues of English History," "Dialogues on Canadian History," and "The Hunters' Adventures in the Canadian Wilderness."

A staunch Presbyterian and a Conservative, he represented his party in the House of Commons at Ottawa as member for East Huron, having been elected in 1904 and re-elected in 1908. He did not seek election in the reciprocity campaign of 1911. It was largely through his instrumentality that a national monument was erected at the capital to Hon. Thomas D'Arcy McGee, one of the Fathers of Confederation, who was shot by a Fenian in 1868.

Doctor Chisholm was married in 1866 to Miss Margaret Gerrie, of Aberdeen, Scotland, who predeceased him in the fall of 1930. Surviving are two sons, J. H. Chisholm, of Simcoe, and John S. Chisholm, of Prince Albert, Sask., and one daughter, Mrs. W. G. Collison, of Lindsay.

The passing of Doctor Chisholm removes a genial, rugged personality from the public life of Ontario. He was one of the last of the old-time physicians ministering to the needs of pioneer settlers, scattered over a wide area.

Dr. Joseph Dobbin, for many years head of the x-ray department of the Jeffrey Hale Hospital, Quebec, died on October 17, 1931. He was born in 1878 and graduated in medicine from Laval University in 1902.

Dr. Ernest Winstanley Ellis, of Toronto, died on October 5, 1931, after a lingering illness in his thirty-ninth year. Doctor Ellis graduated M.B. of Toronto University in 1921.

Dr. Duncan A. MacDonald, of Winnipeg, was stricken with angina at Deer Lodge Military Convalescent Hospital on October 6, 1931, and died a short time later at his residence.

Born in Tobermory, Scotland, Doctor Macdonald had only recently reached his fiftieth birthday. At the age of three years he came to Winnipeg with his parents and was educated in the public schools and Manitoba College. While a student there he enlisted in the Canadian Expeditionary Force and saw active service in the South African war. On his return he entered the Manitoba Medical College from which he graduated in 1907. In his medical practice he became interested in the field of neurology. He served in the war of 1914-1918 and became Neurologist for the Winnipeg District under the Department of Pensions and National Health.

Doctor Macdonald took a keen interest in the affairs of the Medical Alumni Association of which, for many years, he was the Secretary-Treasurer. He is survived by his widow and three children. His genial disposition made him a general favourite with the medical profession and in military and church circles.

Dr. George Thomas McKeough, the grand old man of the medical and surgical profession of Chatham and district, passed away peacefully at Erie Manor, his country estate on the shore of Lake Erie, on October 1, 1931.

Doctor McKeough was born in Chatham, Ont., in 1855, the son of William McKeough, one of the pioneers of Kent, and received his early education in the public and grammar schools of Chatham, and graduated from the College of Physicians and Surgeons in 1872. He then entered the office of Dr. T. K. Holmes for a year, and returned to Trinity College Medical School where he graduated in 1877. In the same year he took his degree from the University of Toronto. He spent three years travelling in Europe, where he took post-

graduate courses in the London, Edinburgh and Paris hospitals. He became a member of the Royal College of Physicians, and was given a fellowship of the Obstetrical Society of London, England. He then returned to Chatham and entered a partnership with Dr. T. K. Holmes, which continued for 25 years. Afterward Doctor McKeough continued in active practice until 1920.

He was a member of the Chatham Board of Education for 20 years, and was also a member of the Board of Health. He was for years the Secretary for Ontario of the Canadian Medical Association, and also Vice-President of the Ontario Medical Association. He was one of the first doctors to be elected Fellow of the American College of Surgeons.

During the war Doctor McKeough accepted the commission of Major, and did excellent service in the medical and surgical branches of the Canadian Army until 1915, when he was compelled to return to Canada on account of ill health. Shortly afterward he retired to his country home.

He was the first Honorary President of the G.W.V.A., a position he held to the last. He took a keen interest in horticulture, and was one of the best known naturalists of this district. He was Honorary President of the Chatham and Blenheim Horticultural Societies, a Trustee of the Cedar Springs School Section, and a member of the Blenheim Library Board. In 1925 he was made Honorary President of the Kent Medical Society, and he was also an honorary member of the Detroit Medical and Library Association, as well as a member of several ornithological clubs in the United States. Doctor McKeough was Honorary President of the Chatham and Kent County Alumni Association of the University of Toronto and an honorary member of the Surgeons' Club of London, Ont. He took a deep interest in Church affairs, and for years was an elder of the First Presbyterian Church of this city.

In 1881 Doctor McKeough was married to Catharine, the fourth daughter of David Morris of Ste. Therèse de Blainville, Que., who survives him. Also surviving are two daughters, Mrs. Walter Elliott, of Owen Sound, and Mrs. Hubert Higgenbotham, of Cobourg. Mrs. W. T. Shannon of Chatham is a sister.

Dr. Alexander Shaver, of West Hamilton, Ont., who was perhaps the oldest physician in Wentworth County, having been in practice for fifty-five years, died on October 2, 1931, at the home of his son, A. Laurence Shaver, K.C., M.P.P. for North Wentworth in Dundas. He was 80 years of age.

Doctor Shaver was born in Ancaster and was descended from a line of sturdy ancestors, his grandfather having settled there in 1778. He graduated from the Toronto School of Medicine in 1876, and, after being associated for a time with the late Dr. H. Walker of Dundas, he engaged in practice for himself at the village of Flamboro', where he remained for ten years. He then moved to a farm on the Third Concession of Flamboro', where he practised until 1915, when he moved to West Hamilton.

Doctor Shaver was a rural family physician of the old school, who knew many hardships and whose horse and buggy were often watched for from the windows of lonely farmhouses on the back woods. It was his pride that, in all his years of practice, he never lost a maternity case.

Doctor Shaver's wife, who was Margaret V. P. Miller, of Toronto, died in 1905. Other survivors are one daughter, Mrs. Jean Whitaker, Hamilton; and three sons, William M. Shaver and George V. P. Shaver, of Hamilton, and F. Bruce Shaver, of Victoria, B.C.

Dr. John George Moore Sloane, a graduate of Toronto University, died at the age of 58 years, at his home at Holford, Somerset, England, on August 24th from an attack of cerebral embolism. A previous

attack some years ago, which left him partially crippled but still able to be active and in the full enjoyment of life, caused him to retire from active practice, after which he took up his residence at Holford, where he purchased a suburban property, beautifully situated in the shadow of the Quantox Hills and within a mile of the Bristol Channel, across which on a clear day the shore line and mountains of Wales are visible. Here he, with his devoted wife and daughter Isabel, had lived for over five years the ideal life of a retired practitioner, happily and busily occupied in the cultivation of a large fruit and vegetable garden and all varieties of flowering plants in which Mrs. Sloane has specialized very successfully. Experiments in poultry raising and the culture of bees also were carried on as part of his diversified interests.

It was the privilege of the writer of this sketch to enjoy for a week during the summer of 1929 the hospitality of Doctor and Mrs. Sloane, and to visit many places of interest and scenic beauty in incomparable Somerset and Devon.

The late Doctor Sloane was born at Annan, Ontario, in 1873, and following graduation (M.B., Toronto, 1895) he practised in Bruce County at Owen Sound, Shallow Lake, and Lyon's Head for some years. Coming to Edmonton, Alberta, in 1904, he quickly established himself as a successful physician and surgeon and an energetic promoter of the development of the rapidly growing city. Enlisting for war service in 1915, he eventually became attached to the R.A.M.C., and served with distinction at Salonika and in the Caucasus on the Eastern Front. Towards the close of the war he filled a hospital appointment in Ireland for some time and later on a similar position at Rensbury Hall in Cheshire.

He leaves to mourn his loss, in addition to his wife and daughter Isabel, his eldest daughter Helen, who is now Mrs. Charles Davenport, of Nantwich, Cheshire; two brothers, Allan C. Sloane, pharmacist and druggist, of Edmonton, an ex-Alderman of the city; and James Sloane, of Hamilton, Ontario; and four sisters, Mrs. Dugleish, of Dawson City, Misses Maria and Isabel Sloane, of Hamilton, and Mrs. H. McKellar, of Toronto.

T. H. WHITEHEAD

POSTVACCINAL MYELITIS.—T. W. Brockbank calls attention to the fact that the acute inflammatory lesions of the nervous system reported as occasionally following vaccination against smallpox usually have presented the clinical symptoms of encephalitis or poliomyelitis. In cases with paramount spinal cord involvement, even when the lesions accompany smallpox itself, the sensory impairment has been negligible or transient. As a contrast to this generally accepted picture, he reports a case of postvaccinal myelitis with complete spinal anaesthesia persisting up to the level of the ninth dorsal segment and paralysis. The clinical and laboratory signs of spinal meningomyelitis are presented. The sensory level seemed to indicate that the inflammation in the acute stage had progressed only to the level of the fifth dorsal segment, although motor signs pointed to mild inflammatory involvement in segments considerably higher. The sensory level two months after onset was in the eighth dorsal segment. The prodromal symptoms began on the thirteenth day after vaccination.—*J. Am. M. Ass.*, 1931, 97: 227.

News Items

Great Britain

Sterilization of Mental Defectives.—On July 21st, in the House of Commons, Major Church asked leave to introduce a Bill to enable mental defectives to undergo sterilizing operations or sterilizing treatment upon their own application, or that of their spouses, or parents or guardians. He said that those associated with him realized that in making this request for permission to introduce this Bill they were asking the House to do something which could be regarded as being in advance of public opinion. (Hear, hear.) They realized that they had got to convert a large section of the people to a full appreciation of the principles underlying the Bill. His opinion, although it was not that of all those associated with him in promoting this measure, was that this was merely a first step. It was a step in order that the community as a whole might be able to make an experiment on a small scale, so that later on the community would have the benefit of the results of the experience gained and be able to come to conclusions before compulsory sterilization proposals for unfit persons were put forward.

It might be urged that mere sterilization was not enough and was not a cure for the problem of mental disease. He and those associated with him did not suggest that it was; but they suggested that since knowledge compiled as to the ancestry of mental defectives in a number of different states and countries showed that anything from 45 to 80 per cent of the mental defectives had inherited defective germ plasma, it would be advisable to take the risk of sterilizing the defectives, and that in the course of a generation or so their number could be reduced to measurable size. If the Bill was printed hon. Members would see that so far from attempting to violate the laws of morality all it proposed to do was something which large numbers of social workers, 53 of the borough councils in the country, whole masses of opinion in the medical and scientific professions, and many biologists believed to be the right course.

Dr. Morgan urged the House not to approve what he said was anti-working-class legislation. Nature had its own way of dealing with mental defectives—namely, by limiting their progeny. (Cries of "No.") They did not want nousey Parkers poking about, or to be influenced by eugenic nightmares. If what Major Church said was true what became of the great scientific doctrine of the survival of the fittest? There were two sources of mental defectives—those high up and those low down. It was well known that high-grade defectives had a high percentage of fertility. The cause of low-grade defectives was living under subnormal conditions and being submerged in poverty. There were defective germ plasmas in every family; and it was computed that the chance of a defective paternal and maternal plasma uniting was one in five millions. The House should reject this Bill and leave these poor people to be dealt with by the alternative method of segregation and socialization.

The motion for leave to introduce the Bill was rejected by 167 votes to 89—majority 78—*The Lancet*.

London's University Centre.—The housing of the University of London, which has been for years the subject of acrimonious discussion, seems likely to be finally provided for on a site of some ten acres northward of the British Museum. The headquarters of the University have been successively located at Somerset House, Marlborough House, Burlington House, Burlington-gardens, and at South Kensington, and as reported in 1911 by the Royal Commission, of which Lord Haldane was chairman, "His Majesty's Government has been responsible for the housing of the University throughout

its history." The University buildings in Burlington gardens, familiar to an earlier generation of graduates, were erected by and at the expense of the Government in 1871 for the exclusive use of the University, and the foundation-stone still bears its name, while its adornment with the statues of Newton, Harvey, Locke, Bentham, and others testifies to the academic purpose of the buildings. It was in 1899 that the Senate was induced, somewhat reluctantly, to transfer the University Headquarters to what was described by the Treasury as "an adequate and dignified home for the University in the Imperial Institute buildings" at South Kensington. At that time, under the Act of 1898, the University was undergoing one of its reconstitutions, and the Government vouchsafed, in a Treasury minute of February 16, 1899, that the new accommodation would not only be fully equal to that at Burlington-gardens but that there should also be "such provision as may hereafter be needed for the full extension and development of the University under the statutes and regulations made by commissioners appointed by the Act of 1898."

Within ten years it was evident that the accommodation at South Kensington was quite inadequate for the growing work of the reconstituted University and was also inconvenient in other respects. In 1912 a first attempt, which proved abortive, to remove the University to a site in Bloomsbury attracted public attention. Other sites at Hampstead, at Kensington, at Somerset House were suggested, and the Senate at one time favoured the Foundling Hospital site for its future home. When Mr. H. A. L. Fisher was President of the Board of Education in 1919 he advised the Government to offer to the University "a site and buildings near the British Museum." In 1920, however, this offer was modified to the exclusion of providing the buildings; it was also conditional on the transfer of King's College to the Bloomsbury site and the surrender of the present premises of the University as well as the site and buildings of King's College to the Government. Owing to the refusal of King's College to move, the offer was declined by the Senate. Eventually, however, the site, after resale to the vendor, was purchased in 1927 for £525,000, the Government contributing £212,500, while the Rockefeller foundation generously provided the funds required for completing the acquisition of the land. The Treasury made their contribution on the understanding that it was "intended to be in full satisfaction of any liabilities that might be deemed to lie upon the Treasury under the Treasury minute of 1899 to provide accommodation for the future development of the University."

On Presentation Day last month Earl Beauchamp, the Chancellor, announced that the Court of the University were within sight of securing the money for the buildings to be erected on the site during the next five years, and that the laying of the first stone would take place within the next twelvemonth. The cost of the scheme is anticipated to be between £2,000,000 and £3,000,000.—*The Lancet*, 1931, 1: 1303.

A Tribute to Michael Faraday.—To commemorate the centenary of Faraday's discovery of electro-magnetic induction, the September issue of the *British Journal of Physical Medicine*, (17, Featherstone Buildings, London, W.C.1: 3/- post free), took the form of a "Faraday Centenary Number". This comprises a review of practically all the uses of electricity in medicine, and demonstrates the important place this agent occupies in modern diagnosis and treatment.

An article by Prof. Sidney Russ deals with Faraday's life and work, and Dr. W. J. Turrell writes on "The influence on electrotherapy of Faraday's work and teaching". The subject of "The physical basis of medical electricity" is dealt with in an exceptionally lucid manner by Mr. B. D. H. Watters. This article explains the nature of electricity, and its generation and measurement, in clear and simple language, and

should be studied by all who have to deal with electrical currents in medicine.

The therapeutic uses of the faradic, galvanic and sinusoidal currents, of high frequency and diathermy, of static electricity and ultra-violet irradiation, are dealt with by authorities in these branches of electrotherapy. Prof. A. Fullerton writes on "The debt which urology owes to Faraday"; Dr. J. F. Carter Braine on "X-rays in therapy"; and Mr. C. H. Thomas on "Bronchoscopy".

The whole issue presents an authoritative review of the uses of electricity, and will be found of considerable value not only to those who undertake any of the therapeutic or diagnostic methods mentioned, but to those who wish to become acquainted with their great possibilities in the treatment or diagnosis of an increasingly wide variety of conditions.

Gift to the British Empire Cancer Campaign.—Sir William R. Morris, Bt., has made a gift of £25,000 to the British Empire Cancer Campaign for the foundation of a research fellowship in radiology, tenable at Mount Vernon Hospital, Northwood. This hospital was opened in 1929 as the Empire centre for the treatment of patients suffering from cancer, and for the investigation of the causes and cures. We understand that it is intended to appoint to this fellowship a whole-time radiologist for the investigation of deep x-ray therapy, and that it is hoped to secure for the post a worker of such standing as to be eligible for a professorship in connection with the National Radium Centre and Post-Graduate School of Radiotherapy. This brings the total of Sir William Morris's donations to medical charities in recent years to a sum exceeding £500,000.

Alberta

Dr. J. D. Heaslip, of Manville, Alberta, has gone to New York and other eastern points to take an extensive course in post-graduate work.

Dr. J. W. Auld, of Calgary, has just completed a six weeks' course in dermatology and x-ray at the Polyclinic, Philadelphia.

British Columbia

The Commission to enquire into drugless healing in British Columbia will begin on November 19th, Judge Murphy having been appointed to conduct the investigation. It is stated that the various cults are making elaborate preparations and intend to make a strong bid for legal recognition.

Dr. A. S. Monro, President of the Canadian Medical Association, attended the annual meeting of the Alberta Medical Association, in Calgary, on September 18th, speaking on the problem of supplying adequate medical service to the community at a cost within the reach of the ordinary householder.

The City of Vancouver has recently opened the first unit of a preventorium for tuberculosis. Twenty-five children from tuberculous homes, but not themselves the subjects of the disease, have been admitted. School classes are provided, and it is planned to keep the patients till they reach the age of fifteen. The building, in the east end of the city formerly used as a small-pox hospital, after being remodelled, is being used as a beginning in what it is hoped will develop into a much more comprehensive program.

In connection with the construction camps which the authorities are planning, to cope with unemployment at the coast during the coming winter, it is announced that

medical attendance will be provided as far as possible, by neighbouring practitioners, and not, as had been proposed, as a definitely organized service. Nothing has as yet been stated as to the basis upon which such work will be paid for.

The British Columbia Board of Health commenced in September the publication of a monthly bulletin, the first number being mimeographed. Vital statistics, infectious diseases, and a study of cancer in British Columbia from 1921 to 1930 are included. Personal items relating to the Public Health Nursing Service receive a page, and contributions from those interested are invited. The Bulletin is distributed without cost to the profession, and should serve to keep the members informed as to activities in public health and to build up better and more complete returns to the Board.

At the first meeting of the Vancouver Medical Association for the winter, held on October 6th, Dr. J. S. Burris, of Kamloops and Dr. A. S. Lamb, of the Provincial Board of Health, spoke on tuberculosis.

In connection with the recent extra-mural lectures throughout the province, lasting from August 29th to September 17th, meetings of the East and West Kootenay Medical Association were held, officers elected, and local problems discussed.

C. H. BASTIN

Manitoba

Winnipeg medical men have been pleased to learn of honours bestowed on two of their number. Dr. Geo. F. Stephens, Superintendent of the Winnipeg General Hospital, was elected President of the American Hospital Association at the recent annual meeting of that body in Toronto. Dr. W. Harvey Smith, Past-president of the British and Canadian Medical Associations, and a graduate of McGill in 1892, received the degree of LL.D. from his alma mater at the convocation in connection with the McGill graduates' Reunion.

The St. Boniface Sanatorium, beautifully situated on the east bank of the Red River opposite the Manitoba Agricultural College, was formally opened on the evening of September 29th by Premier Bracken in the unavoidable absence of His Honour the Lieutenant-Governor. Dr. J. D. Adamson, Medical Director of the Sanatorium, presided and addresses of congratulation to the Grey Nuns were delivered by His Grace Archbishop Sinnott, Abbé Brodeur, Hon. Dr. E. W. Montgomery, and Dr. D. A. Stewart. Dr. E. J. Boardman, President of the St. Boniface Hospital staff, extended thanks to the speakers.

The Sanatorium is composed of three buildings; a main building containing about 200 beds, a children's pavilion with 50 beds and the power house. All the buildings are connected by tunnels. The Sanatorium, which is the last word in construction and equipment, cost over \$700,000, and many felicitations were extended to the Grey Nuns who, in such trying times, have been able to raise such a large sum. With the completion of this sanatorium Manitoba has now more beds for tuberculous patients per capita than any other province.

Drs. D. S. MacKay and G. S. Fahrni, of Winnipeg, recently made a tour of Saskatchewan under the extra-mural post-graduate scheme.

ROSS MITCHELL

New Brunswick

During the month of September Dr. C. R. Bourne and Dr. Fraser Gurd, both of Montreal, addressed meetings in Newcastle and Sackville. Dr. Bourne's address concerned "The cardiac arrhythmias". Dr. Gurd spoke

on "Acute perforative appendicitis". Reports of these meetings were very flattering.

At the same time, a further group from Montreal addressed meetings in Woodstock, Saint John, Fredericton, Moncton and Campbellton. Dr. C. G. Moffatt spoke on "Cardio-vascular disease", and Dr. George D. Little treated the "Acute abdomen". The attention that has been given to more accurate diagnosis of cardio-vascular disease has produced a group of interesting speakers who have visited us throughout the last few years. Each of these speakers, however, has been able to provide something new, either in treatment of the subject or treatment of disease. This was Dr. Little's first appearance in our province and his discussion of new methods of attack in laparotomy was most interesting and evoked most spirited discussion.

While making his initial official visit to New Brunswick, the Governor-General, the Earl of Bessborough, kindly consented to officiate at the opening of the new general hospital of Saint John. The ceremony was decidedly quiet. No public attendance was possible on the short notice available. However, the citizens of Saint John were delighted that His Excellency was gracious enough to officiate at the opening of a monument to civic enterprise of which they are proud.

A. STANLEY KIRKLAND

Nova Scotia

While the attendance at this year's Dalhousie Refresher Course was rather less than in previous years, nevertheless a goodly number was registered. The course was conducted entirely by members of the Dalhousie Faculty, and was highly commended by those who attended.

Dr. A. S. Burns, of Kentville, and Dr. R. M. Benvie, of Stellarton, have recently been patients at the Victoria General Hospital, Halifax. Dr. Burns' admission was necessitated by injuries received in a motor accident, while Dr. Benvie entered for a surgical operation. It is pleasing to be able to report that both are convalescing satisfactorily.

The Halifax profession has been interested in an investigation of charges of political partizanship preferred against certain members of the medical staff of Camp Hill Hospital—a hospital for ex-service men. The investigation, which has gone on at intervals for several months, has been concluded, and the report of the Commissioner has been forwarded to Ottawa. Action by the Ottawa authorities is now awaited.

Dr. John W. Denoon (Dalhousie '31), after spending the summer months as surgeon to the D.G.S. *Arras*, which served as hospital ship to the fishing fleets on the Grand Banks, has left to spend a year at graduate study in the Mother Land. Last spring Doctor Denoon was awarded an I.O.D.E. Post-Graduate Overseas Scholarship. When the year's study to which this entitles him has been completed, it is his plan to devote another year to study on the Continent.

Miss Beatrice Andrews, for more than ten years the efficient and loved Superintendent of the Sydney City Hospital, died on September 21st after an illness which, while extending over more than a year, had incapacitated her for only a few days. The esteem in which she was held was manifested at her funeral, which was very largely attended, and at which the city council, the medical profession, and other organizations were officially represented.

The Pathological Institute, hitherto an integral part of the Victoria General Hospital, although it has housed

the laboratories of the Provincial Department of Health, has now come under the jurisdiction of the Department of Health. The Act constituting the Ministry of Health places all hospitals which are maintained by the provincial government under the Minister, and the Victoria General Hospital comes in that category. One reason for the change is that hospitals throughout the province may feel freer to make use of the Institute and be encouraged to send to it tissues which may be suspected to be cancerous. The Victoria General Hospital will be served quite as in the past, and no change in the personnel of the Institute is anticipated.

W. H. HATTIE

An echo of the Great War stirred memories at Liverpool, Nova Scotia, when the flags of the 1st Canadian Casualty Clearing Station, B.E.F., were presented to Trinity Church by Colonel F. S. L. Ford, C.M.G., the first Commanding Officer.

On Sunday, August 16, 1931, within four days of the seventeenth anniversary of the departure from Liverpool of the nucleus of this unit, this impressive ceremony drew old comrades and friends from afar, one ex-member coming from Detroit, and two others from Ontario. Over two hundred veterans from all branches of the defence forces, under the command of Colonel C. H. L. Jones, O.B.E., and headed by the Liverpool Band, marched from the Town Hall to the church, where, with the colour party, they were received by the Rector and Wardens, who, on behalf of the church, accepted the flags, which were afterwards hung in the chancel. A memorable service marked the laying up of the flags, the preacher being Major the Revd. A. P. Shatford, C.F., of Montreal. A tablet, the gift of Colonel Ford, in memory of the Officers, Nursing Sisters, N.C.O.'s and Men of the unit who did not come back was unveiled by the donor. In the evening a re-union dinner was held at the Mersey Hotel, and the hope was expressed that this might become an annual affair.

Ontario

The Annual Dinner and Stated Meeting of the Academy of Medicine, Toronto, was held in the Crystal Ball-room of the King Edward Hotel on the evening of October 6th. There were 262 present, including guests. Among the latter were representatives of the Ontario Government, the University of Toronto, and many other important bodies in the city, some of whom contributed to the program with short addresses. Attractive selections of vocal and instrumental music were rendered by well-known artists.

The principal feature of the evening was the inaugural address of the President, Dr. Harris McPhedran, who chose as his subject "The varied interests, activities and responsibilities of the Academy of Medicine, Toronto." He dealt clearly and fully with many matters of great practical interest to all members of the profession, and made many stimulating suggestions along new lines.

An event of historic importance was the presentation of a handsome badge of office to the President. This will be worn on all occasions when the President is in the chair. The donor, Dr. John Ferguson, who made the presentation, speaking in his cultured, easy style, was particularly happy in his remarks. It was felt by the Fellows that the annual dinner and meeting of this year had been an outstanding success.

On September 9th, a team of golf players from the Academy of Medicine, Toronto, visited Hamilton, at the invitation of the Hamilton Medical Society, and played a tournament at the Ancaster Golf and Country Club. The game resulted in a win of one point for Hamilton, score 9-8. Everybody reported having a very enjoyable game.

At the dinner which followed, Dr. G. J. Lunz, of Hamilton, reported the donation of a cup by Mr. Josiah K. Lilly, of Rochester, for a challenge competition amongst medical societies of Buffalo, Syracuse, Rochester, Hamilton and Toronto.

The delegation from Toronto consisting of Drs. Shouldice, Givens, James and Davidson, met at Rochester during the Rochester, Hamilton inter-club match. The suggestion of the Toronto committee that the competitions be held annually at one of the cities specified by the Trustees of the Lilly Cup, following as nearly as possible the rules and regulations of the Leslie Cup, met with the approval of the other delegations. Each player participating will be liable for his own expenses.

On September 18th, an Autumn Field Day was held at Scarboro Golf and Country Club, in which some 80 Fellows played golf, and at the dinner following 65 were present.

The President of the Academy, Dr. Harris McPhedran, presided at the dinner and presented the prizes to the different winners. Winner of the F. N. G. Starr Golf Trophy, Dr. R. E. Davidson; runner-up, Dr. R. D. Lane; runner-up of the Section 1-16, Dr. W. C. Givens; runner-up of the Section 17-32, Dr. Harold McClelland.

The chief winners for the day were: Special low gross, Dr. W. C. Givens; Special low net, Dr. R. D. Lane.

An impromptu program of entertainment was put on by some of the Fellows which contributed largely to round out a most successful meet.

On October 23rd, a special meeting of the Academy of Medicine, Toronto, was held, which was addressed by Prof. William Wright, Dean of the London Hospital Medical College, on the subject "A lecture on anatomy as it would have been given by Andreas Vesalius, 1514-1565", and also by Prof. George A. Buckmaster, University of Bristol, on "Reminiscences of the founders of English physiology."

The Rosedale Chapter of the Daughters of the Empire, Toronto, recently presented to Dr. F. J. Conboy, Director of Dental Services in the Department of Health of the Province of Ontario, a new dental car to be used in Northern Ontario. The car was equipped at a cost of about \$5,000. It is painted a glossy maroon colour and is a self-contained dental clinic with living quarters for those in charge and has its own electric plant with special generator to run the dental appliances; also heavy capacity water tank and furnace. The living quarters include an attractive sitting room with radio, rooms for the dentist and his wife and for the nurse, shower-bath, kitchen with refrigerator and built-in stove. In addition, there is a waiting room for patients and a clinic with complete modern apparatus. Dr. Brownlow is to be the dentist in charge, and it is planned that the car will leave immediately for the north.

From the estate of the late Colonel Gartshore, of London, Ont., a bequest of \$50,000 goes to the University of Western Ontario and a similar sum to the Victoria Hospital, London. Plans are now under way for the rebuilding and enlarging of the Victoria Hospital. To help defray the cost, the city of London has contributed \$200,000 and the Ontario Government \$300,000, while an additional \$500,000 will be raised by subscription.

Dr. Edmund Percy Lewis will be succeeded as Director of the Division of Mental Hygiene in the Toronto Department of Public Health by Dr. Charles G. Stogdill, a graduate of the University of Toronto in Arts and Medicine, and M.A. in Psychology.

At the ninetieth annual meeting of the Royal Medico-Psychological Association of Great Britain, held at the Royal College of Physicians, Dublin, July 8th to 11th, Dr. C. M. Hincks, Director of the Canadian

National Committee for Mental Hygiene and General Director of the (U.S.) National Committee for Mental Hygiene, was elected a Corresponding Member.

J. H. ELLIOTT

Quebec

A decrease in the general death rate for the first seven months of 1931, and a similar reduction in the birth and marriage rate is shown, Dr. J. P. Decarie, inspector-general of the Provincial Health Department, stated in commenting upon the general health conditions of the province.

There were 48,798 births from January 1 until July 31, compared with 50,763 for the same period in 1930, while in 1931 there were 9,188 marriages as against 10,313 in 1930.

As to deaths, 20,214 were reported during seven months in comparison with 21,529 for the same period of the previous year. Of this number, 5,142 were cases of infantile mortality with a death rate of 105 per 1,000 births.

Measles heads the list of contagious diseases prevalent this year in Montreal, according to a report of the health department issued by Dr. S. Boucher. To the end of August 6,140 cases of this malady have been reported, as against 1,767 last year.

The other contagious diseases are classed as follows:

	July	Aug.	1931 to date	1930 to date
Diphtheria	40	45	396	573
Scarlet fever	44	57	1,056	1,619
Measles	229	52	6,140	1,767
German measles..	3	1	95	643
Whooping cough..	58	81	635	1,576
Mumps	6	1	361	2,217
Chicken-pox	66	23	1,598	1,793
Small-pox .....	..	..	....	5
Cerebrospinal meningitis ....	..	..	5	35
Erysipelas	11	14	133	154
Typhoid fever ...	33	23	85	56
Infantile paralysis	4	95	100	7
Puerperal septicæmia ...	1	..	17	..
Purulent ophthalmia ...	3	1	13	6
Totals	498	393	10,635	10,451
Tuberculosis	166	185	1,532	1,467

Infant mortality shows a decrease compared with 1930. Up to the end of August, 1931, 1,606 deaths under one year had occurred whereas last year up to the same date 1,771 had been reported.

Deaths from various sources are shown for July and August last as follows: typhoid, one death; tuberculosis of the lungs, 136; pneumonia, 22; broncho-pneumonia, 32; cancer, 119 (this is a decrease over the two months in 1930 when there were 142 deaths); Bright's disease, 107; accidents, 99.

To October 1st, the number of cases of infantile paralysis definitely classified as that disease amounted to 338.

Of the total of 338 indicated by the Board, 22 were outsiders brought into Montreal for hospital treatment. There were 254 families in which there were 1 case each. In 26 families there were 2 cases per family. Seven families had 3 cases, and 1 family had 4 cases. Three public institutions have cases reported, one of them 4, another 2, and a third 1.

The age classification is, birth to five years old, 235 cases; six to ten years, 79 cases; 11 to 15, 17 cases; 16 to 20, five cases; 21 to 30, two cases.

Saskatchewan

Dr. J. A. Brown has begun practice in Regina. He obtained his early education in Regina and took his B.A. from the University of Saskatchewan in 1922, and became principal of Brandon Collegiate Institute. He graduated in medicine from the University of Toronto in 1927. He was an interne in Montreal General Hospital for two years, then spent a year at the Howard A. Kelly Hospital, Baltimore, the following year going to Iowa State University Clinics. Dr. Brown is specializing in gynaecology, obstetrics and urology as applied to women.

LILLIAN A. CHASE

United States

A Noise Silencer for Hospitals.—Several New York hospitals are said to be installing a new device for excluding noise which has been invented by Mr. Hiram Maxim. The apparatus consists of a box a foot wide and 10 inches high. It is placed on a window-sill and the window closed down to the top of the box, and although a large volume of air is admitted outside sounds are so completely excluded that even the noise of a pneumatic drill is unheard. The apparatus itself makes a noise comparable to that of an electric fan.

Yale University.—Yale University dedicated, on May 9th the new building of the Institute of Human Relations, established two years ago for scientific investigation of human behaviour. Speakers at the dedication were Dr. Ray Lyman Wilbur, secretary of the interior, Washington; George E. Vincent, Ph.D., New York, former president of the Rockefeller Foundation; Gov. Wilbur L. Cross of Connecticut, for many years dean of the Yale Graduate School; and President James Rowland Angell, all of whom discussed the functions and possibilities of the institute. Quarters are provided for the department of psychiatry and mental hygiene, a department of psychology, a child development clinic, a division of psycho-biology, and research divisions in the social sciences, including law, religion, industrial engineering, sociology, and anthropology.

Stanford University.—The board of trustees of Stanford University has accepted an offer of \$2,500,000 from an unannounced donor toward the erection of a medical school building. The gift is on condition that the University endow the building with an additional \$1,250,000, the sum to be raised before February 1, 1932.

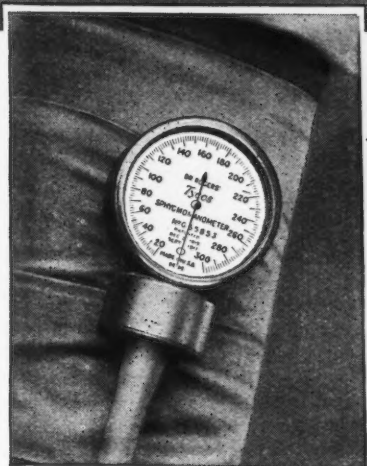
General

A Hospital in the Far North.—Bishop Turquetil, who spent more than twenty years in work in the Arctic regions and is known as "the Bishop of the Arctic," will open a hospital at Chesterfield Inlet, 500 miles north of Churchill, Manitoba. Accompanied by four Grey Nuns the Bishop left Churchill at the end of July to travel a hazardous trip in a 25-foot motor boat along the west coast of Hudson Bay to Chesterfield Inlet. The hospital will serve the nomadic Eskimos and the hunters and prospectors who search for fur and gold on the fringe of the Arctic Circle. Educational courses in hygiene and in preventive medicine will be given the Eskimo children by the sisters and staff of the hospital.

Royal College of Physicians and Surgeons of Canada.—It is announced that Drs. W. J. Carrow and E. A. Irwin both of Toronto, were the only two successful candidates out of seven taking the recent primary examination of the Royal College of Physicians and Surgeons of Canada, held in September.

The Second International Congress for Light will take place in Copenhagen from August 15 to 18, 1932.

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MONTREAL

The following are the subjects for discussion. (1) The rôle of pigment in light biology and the therapeutic effect of general light baths. Principal speakers: Dr. Brody (France), Professor Miescher (Switzerland). (2) How is the action of the general light bath in tuberculosis to be explained? Principal speakers: Sir Henry Gauvain (England), Professor Jesionek (Germany). (3) Helio-climatological research in relation to public health: its organization and physiological basis. Principal speakers: Professor W. Hausmann (Austria), Professor A. Rollier (Switzerland). (4) Report by the international committee for the determination of a standard unit of measurement for ultra-violet radiation. Read by Dr. Saidman (France).

Further information can be obtained from the general secretary, Dr. Kissmeyer, Finsens Lysinstitut, Strandboulevarden, Copenhagen.

Dr. Thomas F. Cotton, a graduate in medicine in 1909, will represent McGill University at the 250th meeting of the Royal College of Physicians and Surgeons of Great Britain which will be held at Edinburgh, November 29th and 30th and December 1st. Dr. Cotton who is physician to the out-patient department of the National Hospital for Diseases of the Heart is regarded as one of the foremost heart specialists in Europe.

Dr. Oskar Minkowski, formerly professor of internal medicine at Breslau, who discovered the internal secretion of the pancreas, died recently at Wiesbaden, aged 73.

Centenary of Fournier. — The syphilographer, Alfred Fournier, was born in Paris on May 12, 1832, and he died on December 25, 1914. The centenary of his birth is to be celebrated next year with an international conference on syphilis, from May 9th to 12th. Preparations for this conference are proceeding apace, and the International Union Against Venereal Disease has chosen as one of the principal speakers Mrs. Neville Rolfe, secretary-general of the British Social Hygiene Council. Other speakers will be Prof. Jadassohn, of Berlin, Prof. Wagner von Jauregg, of Vienna, Prof. Nicolau, of Bucharest, and Dr. Cavaillon, of Paris.

Book Reviews

Backache. Lewellys F. Barker, M.D., LL.D., Professor Emeritus of Medicine, and John H. Trescher, M.D., Assistant in Clinical Medicine, Johns Hopkins University. 235 pages, illustrated. Price \$5.00. Philadelphia, London and Montreal, J. B. Lippincott Co., 1931.

This book, like Caesar's Gaul, is divided into three parts. The first deals with anatomy, physiology and methods of examination of the back. The second part describes the conditions in which backache may occur, *viz.*, chronic arthritis of the spine, tuberculosis, typhoid, neoplasms, congenital malformations, trauma, strain, etc.; it ends with a very interesting and long chapter describing the various disorders of the nervous, urinary, circulatory and other systems, together with acute infections, in which backache may occur. In fact, every possible disease in which backache plays a part is discussed. The third part, which is all too short, is concerned with apparatus, physio-therapy, and surgical operations used in the treatment of backache.

The authors speak of the vague and almost meaningless concepts, "lumbago", "sciatica", and "sacroiliac disease". It is pointed out that at one time there was a marked tendency to attribute the majority of backaches in women to gynaecological disorders, but a critical analysis of these cases has led to the conclusion

that many can be more properly attributed to other disorders. The authors point out the tendency, all too prevalent among some physicians, to depend almost entirely upon x-rays for a diagnosis of back disorders, neglecting lesions of the soft parts, ligaments, etc. The description of arthritis deformans of the spine is one of the best parts of the book. Spondylitis deformans is divided into three groups: (1) The hypertrophic or osteo-arthritis; (2) simple, atrophic or infectious spondylitis, or rheumatoid arthritis, and (3) the chronic and rarer ankylosing spondylitis with two subtypes which run into each other, Marie-Strümpell and Bechtrew. As to etiology, the focal infections are considered as of prime importance, especially in the consideration of the atrophic or infectious types.

The book is well written and exhaustive, and is particularly good as regards description and classification. Sciatica, somewhat to be regretted, is no longer recognized as being worthy of special attention. The general air of up-to-dateness in the book is distinctly refreshing, as for instance, where one finds that "referred pain" is being discarded in favour of "nerve root pressure". A distinctly modern and pleasing book on an interesting and little known subject.

Clinical Observations on the Surgical Pathology of Bone. David M. Greig, M.B., C.M., F.R.C.S., F.R.S.E., Conservator, Museum of Royal College of Surgeons of Edinburgh, etc. 248 pages, illustrated. Price 30/- net. Oliver & Boyd, Edinburgh and London, 1931.

The opening chapter of this book is devoted to the general considerations of the physiology and pathology of bone. The author, as he states in his preface, has evolved a working hypothesis that offers an explanation of the reaction of bone to injury and disease that is much simpler and more convincing than those that have hitherto been generally accepted.

In the discussion of the bone forming factors the osteoblasts and osteoclasts fall from their high estate to a relatively insignificant rôle and are superseded by the variation in the balance between blood supply and calcium supply.

The facts concerning the relation of the blood supply to the reaction of bone are collocated thus: (1) maintain circulation within certain limits and bone remains unchanged; (2) produce a definite hyperæmia and bone undergoes rarefaction, decalcification, osteoporosis; (3) restrict the blood supply and bone undergoes consolidation, increased density, osteosclerosis; (4) cut off the blood supply and bone undergoes necrosis. And conversely: (1) normal bone means normal circulation; (2) bone rarefaction means arterial hyperæmia; (3) osteosclerosis means arterial obstruction; (4) bone necrosis means arterial obliteration.

For the formation of bone, however, something else is required than the mere variation in blood supply, namely, an adequate supply of calcium which may be general or local; local, in most of the cases amenable to surgical treatment, being supplied by the local decalcification the result of hyperæmia. The genesis of heterotrophic bone is readily explained on the basis of the hypothesis laid down in the first chapter.

No attempt has been made to include in this book the whole vast subject of bone pathology, yet a sufficient variety of specific lesions from every part of the skeleton is used to thoroughly illustrate what the author considers to be the guiding principles of the pathology of bone. These lesions are trauma, fractures, septic osteomyelitis, tuberculosis, syphilis, post-luxational osteoma, abiotrophy from disuse, traumatic osteoma, fibrositis ossificans, metastatic carcinoma and sarcoma.

Some of the other interesting discussions deal with ossification in cartilage, heterotrophic bone, loose bodies in joints, bone transplants, the mechanism of expansion



...EMPIRE MARKETING BOARD JUSTIFIES METHOD OF MARKETING AYERST COD LIVER OIL★

★ This report, published December, 1930, records an extensive investigation by J. C. Drummond (London) and T. P. Hilditch (Liverpool) of "The Relative Values of Cod Liver Oil from Various Sources." It affirms—

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of bones, the rôle of the periosteum, ossification and radium therapy.

Although the subject of primary tumours of bone is not considered, there is some discussion of "osteogenetic sarcoma". The author believes that there are no cells in the body which possess the inherent properties of producing bone. On this hypothesis there can be no such thing as an osteogenetic tumour. He further states that no sarcoma can form bone unless it taps some supply of calcium, other than that occurring normally in the blood. The observations and deductions in regard to this type of tumour are pertinent indeed.

The text throughout illustrates well that there is in all the disturbances of the economy of bone a homogeneity of response, modified only by local anatomical and functional attributes, and that it conforms to the laws which regulate all tissues indiscriminately. The work is profusely illustrated, principally by most excellent photographs of gross osteological specimens in the museum of the Royal College of Surgeons, of Edinburgh.

Although one may not accept in entirety the hypotheses laid down in this book, one will find that many of the perplexing problems of the physiology and pathology of bone are greatly simplified by the enunciation of principles that run more in accord with clinical and pathological observations.

Fundamentals of Dermatology. Alfred Schalek, M.D., Professor of Dermatology and Syphilology, University of Nebraska College of Medicine, etc. Second edition. 247 pages, illustrated. Price \$3.00. Lea & Febiger, Philadelphia, 1931.

This short work is of distinct value to students of medicine, as the fundamentals of dermatology are covered in a readable manner. The author's classification of the various diseases of the skin is unusual, yet the student will find the various diseases easy to refer to. The dermatological aphorisms are excellent and are truths the students might easily memorize.

In a small work, such as this, it is possible that the reader may have his attention focussed on diseases that are rare and of relatively little importance, and it would seem that the commoner diseases might have been enlarged upon at the expense of the rarer ones. The book is not meant to be a reference work and many things could have been left out. I believe the student of dermatology is always interested in infectious diseases and a short account of these might have been included. The author's account of the various diseases is clearcut and gives one an instant grasp of the condition, while the treatment and care of the patient is sane and not too optimistic. One need not hesitate to recommend this work to students, as they would find it invaluable.

Practical Methods in the Diagnosis and Treatment of Venereal Diseases. David Lees, D.S.O., M.A., M.B., D.P.H., F.R.C.S., M.R.C.P. (E.), Surgeon in Charge of Venereal Diseases, the Royal Infirmary, Edinburgh, etc. Second edition. 634 pages, illustrated. Price \$4.50. Edinburgh, E. & S. Livingstone: Toronto, Macmillan Co. of Canada, 1931.

The second edition of this very complete and practical book embodies the methods which the author has practised in the Venereal Department of the Edinburgh Royal Infirmary. Obviously, a large amount of clinical material has been available, and the author has used this to good advantage. The 87 illustrations and 8 coloured plates are excellent and well reproduced. Attention is devoted about equally to syphilis and gonorrhœa. The subjects of inherited and nervous syphilis are given special attention, and the various methods of treatment are compared and brought up to date. The book contains illustrations of all the instruments used in venereal practice and a pharmacopœia. It is to be recommended highly to medical students and all who are interested in the treatment of venereal diseases.

Streptococcic Blood Stream Infections. George E. Rockwell, M.A., M.D., Associate Professor of Bacteriology, College of Medicine, University of Cincinnati, etc. 73 pages. Price \$1.75. New York, Macmillan Co.; Toronto, Macmillan Co. of Canada, 1931.

This pleasing little volume clarifies to a considerable extent a complicated and most difficult subject in an acceptable manner. The scope is rather wide for the size of the volume, but one has to admit that one has a greater understanding of the subject after a careful concentrated study of the different chapters. All salient points are well studied and excellently presented. The chapters on Infection and Resistance are very well and very practically dealt with. The various factors involved in a streptococcic blood stream infection are thoroughly discussed and objects and results of the treatment carefully outlined. Attention to the details of treatment has its rewards, as seen from a study of the case reports presented. One is impressed by the vastness of the problem and the complicated actions and reactions. External drainage, internal drainage and its complicated components all contribute to the value of the treatment.

In studying invasion by the streptococcus, considerable attention is given to the effects of destruction of tissue, tissue balance upset (trauma, œdema of an allergic reaction, acids, toxins and abnormal metabolism). In the treatment emphasis is laid on support of normal body balance, rest, nursing, heart support, control of temperature as well as the value of antisera, blood transfusions, alkalies, various salt solutions, glucose solutions, water, hydrotherapy, antipyretics and autogenous vaccines. The various remedies are discussed in detail. The ambitious aims of this little volume merit consideration, and we feel that students of the subject will be amply rewarded, both from a theoretical and practical viewpoint.

Determinative Bacteriology. Lehmann-Neumann-Breed. English translation of the 7th completely revised German edition, in 2 volumes. Vol. I. Atlas of Bacteriology and Laboratory Manual, 1930. Vol. II. General and Special Bacteriology, 1931. G. E. Stechert & Co., (Alfred Hafner), 31 East 10th Street, New York.

This is the most classic European laboratory guide and compendium of General and Determinative Bacteriology, and we are pleased to see that it has been translated into English. It is unfortunate that it has been delayed in publication. As many American and Canadian laboratories possess and know the German edition of this valuable work, no extensive review of the English edition is necessary.

The Manual of General and Determinative Bacteriology of Lehmann-Neumann-Breed fills an urgent need for a briefer compendium than the large, ten volume, complete compendium of pathogenic bacteriology prepared by Kolle, Kraus and Uhlenhuth. It is a book which presents our knowledge of the pathogenic and non-pathogenic species in a critical and authoritative manner, pointing out the types that should really be regarded as distinct species and those that should be regarded as varieties.

The fundamental plan of the book is to condense our knowledge of general bacteriology, to furnish a useful guide for the determination of species of bacteria, and to give a critical review of the systematic relationships of all recognized species of bacteria. The laboratory guide gives a clear and concise summary of the most commonly used bacteriological methods, especially those in use in German laboratories. The eminence of the authors in the field of bacteriology and the fact that this book has seen 34 years of intensive use is a sufficient guarantee of its real value.

The value of the English edition is increased by the competence of the men (Dr. Robert S. Breed, Dr. H. H.

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Boysen, Mr. P. Arne Hansen and Dr. Wm. Reiner-Deutsch) who have undertaken the work of preparing the English translation. This laborious work has been completed in an excellent way. By this translation, Dr. Breed and his colleagues have performed a real international service for those who are not familiar with the German language. Many important European bacteriological findings that are very frequently ignored in American scientific literature are made available to all English speaking bacteriologists.

Clinical Diagnosis by Laboratory Methods. James Campbell Todd, Ph.B., M.D., Late Professor of Clinical Pathology, University of Colorado and Arthur H. Sanford, A.M., M.D., Professor of Clinical Pathology, University of Minnesota. Seventh edition, illustrated. Price \$6.00. London and Philadelphia, W. B. Saunders: Toronto, McInsh & Co., 1931.

A comparison of this volume with some of the previous editions leaves one amazed at the marvellous growth in scope and usefulness of the present edition. The advance of this branch of clinical investigations is aptly demonstrated in the careful general and detailed studies of each branch of this subject and its subdivisions. The book meets the demands of the most exacting teacher and student of clinical pathology, and helps further in the fuller recognition and establishment of this important specialty. The instructions in the use of the microscope, the detailed attention to the preparation of material for examination, and clear and concise interpretations make the reading and study of the subject a genuine pleasure.

The book is thoroughly revised and brought well up to date. Indeed it is impossible to offer anything but commendation on the thorough manner in which the subject has been handled and the literature searched. Calcium determinations, blood volume and plasma volume studies are carefully gone into, and the more recent and generally accepted methods are brought well to the fore. The newer methods of gastro-intestinal studies, including the gastric reaction to histamine and alcohol meal, are discussed fully. Each chapter is clearly, concisely and thoroughly treated and is brought well up to date. The chapters on the blood, body fluids, urine and serodiagnostic methods are particularly satisfying. Particular reference should be made to the chapter on vaccines and biological skin tests. This part of the work is full of all the new methods employed in the preparation of material necessary, mode of use and interpretation of the results. Many doubts are eliminated and many known results are emphasized. More recently developed susceptibility tests are also carefully studied and their applied practicability demonstrated. The appendix which deals with the methods for office routine, preparation of reagents, staining solutions, normal solutions and solutions for intravenous use is of considerable scientific and practical value. The index-outline of laboratory findings in important diseases and the references serve to demonstrate the extreme care and concern of the authors to make the work accurate and scientific as well as practical.

The book is heartily recommended to students, practitioners and laboratory workers, as we feel that it meets the requirements that it is intended to fill.

Studies from the Connaught Laboratories, University of Toronto, J. G. FitzGerald, M.D., Director. Volume IV, 1929-1930. The University of Toronto Press.

This volume, the fourth of a series, includes thirty-seven studies by the staff of the Connaught Laboratories. The studies have been published previously, during 1929 and 1930, and they are here assembled in one volume. Two of them, dealing with diphtheria immunization, appeared in the *Annales de l'Institut Pasteur*, others in

the *Biochemical Journal*, the *Journal of Physiology*, the *Canadian Medical Association Journal*, the *Proceedings of the Royal Society of London*, the *Proceedings of the Royal Society of Canada* and the *Canadian Public Health Journal*.

The studies cover a wide range of subjects, from research in physiology and immunology to the training of health workers, giving some idea of the variety of work being carried on at the Connaught Laboratories under the very able direction of Dr. J. G. FitzGerald. The monographs are too numerous to permit of their being commented upon here. The Connaught Laboratories are to be congratulated upon the excellent work they are doing, and the value of having these studies collected in volumes is much appreciated. The name of Connaught Laboratories appearing on the volume is a warrant for the reliability and excellence of the contents.

Textbook of Histology. Eugene C. Piette, M.D., Pathologist and Director of the Laboratory of West Suburban Hospital, Oak Park, Ill., etc. 466 pages, illustrated. Price \$4.50. Philadelphia, F. A. Davis Co.; Toronto, Macmillan Co. of Canada, 1931.

This book gives in compact and legible form a conception of modern microscopical anatomy. The author is particularly well fitted for the task of introducing this subject to students of medicine, for he is a pathologist, and, therefore, knows how to adapt his presentation to the future needs of his readers. On this account it is not, however, merely a "practical" book; quite the contrary, for the pictures are all drawn in against a solid biological background, as one would expect from a man trained in histology and embryology in the Imperial University of Kharkov. A very large amount of excellent histological research work has come in recent years from Russia, and the author is able to give this to us at first-hand. One wishes, however, that he had given references to the contributions which he cites only by the author's name.

Dr. Piette succeeds in establishing the normal of the minute structure of the human body with comparatively few words and the use of numerous and clear figures. Structure is interpreted functionally all the way through—a point admirably exemplified in the description of the liver cells. Chemical correlations are frequently made, as in the analysis of chromatin. Interesting new work on microincineration is given and illustrated, as in figure 15—a "spodogram" of the human cerebellum. The material basis of heredity, so much in the spot-light now-a-days, is brought up-to-date by the introduction of the recent work, particularly on human chromosomes. The endocrine organs get their share of the special treatment which they merit, and we find new work of Corner and P. E. Smith on the hypophysis, Reinhoff on the thyroid, Kampmeier on the adrenal, Bensley and Cowdry on the pancreas, and much more.

Although the author says on page 2 that "A direct study of living tissue gives few results and is useful only for preliminary orientation" his subsequent devotion of much space to the modern technique of tissue culture, microdissection, and other methods of directly observing living cells, and the revelations thereby brought to light, makes us feel that he does not undervalue these indispensable means of cell study. He presents life as the "sum of the lives of the component cells", and builds up our conception of this mystery by revealing the life processes of the wide variety of highly differentiated vital units which make up the human body. His helpful correlations with the field of pathology are brought out in many places, as in the discussion of the relation of normal mitosis to that of malignant tumours, and in his presentation of the cells of blood. The central nervous system has not been relegated completely to works on neuro-anatomy, but there is here all the matter which the student needs to serve as a basis for his later and more specialized studies. The principles of histological

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technique are dealt with, and the resultant deformities to protoplasm brought out.

A book of this kind cannot be other than helpful to all those desiring to know more about the "fabric of Nature herself", as Harvey termed it.

Egypt: The Home of the Occult Sciences. T. Gerald Garry, M.D., M.Ch., M.A.O., M.B.E., Senior Physician, Anglo-American Hospital, Cairo, etc. 93 pages, price 7/6 net. John Bale, Sons & Danielsson, London, 1931.

In this pleasing little book will be found a succinct and scholarly account of the occult sciences as they were known and practised in ancient Egypt, and on this background are marshalled and discussed all the available data relative to that largely mythical personage, Imhotep, called by Osler "the first figure of a physician to stand out clearly from the mists of antiquity." The first two chapters deal briefly with magic and magical ceremonies, and such subjects as mummification, spirits, spiritualism, hypnotism, transmigration of souls, lucky and unlucky days, horoscopes, predestination, and dreams. The third chapter deals with the practice of medicine among the ancient Egyptians as it is revealed in the chief medical papyri, the Ebers, Hearst, Berlin and the Edwin Smith. The author points out that the chief reliance of the ancient Egyptian physician was on suggestion and magic, and strongly discounts the generally accepted view that the ancient Egyptians possessed a great knowledge of the art of medicine and practised it with skill and intelligence. On the contrary ancient medicine as a science made little or no progress for thousands of years. Indeed, "for 4,000 years before Christ medical knowledge remained at a standstill, and during that long period it was practised in the absence of any knowledge of the rudimentary principles of anatomy, physiology or pathology." The fourth, and last, chapter deals with the claims of Imhotep, "guide, philosopher and friend" of the Pharaoh Zoser, Kheri-Heb or Chief Lector Priest, Architect of the Step-Pyramid (the oldest stone building in the world), the Greek Imouthes, the prototype of Asklepios, to be the first physician in history. At the present the question whether Imhotep was a god, a learned man, or a king deified must be settled by Egyptologists. Possibly the excavations now being made at Sakkara may throw some light on the matter. The author concludes, however, that there were other physicians before Imhotep.

This book presents in a clear and attractive way all that is known on a subject that will appeal to those of the medical profession who are interested in the history of their art.

Foundations of Medical History. Sir D'Arcy Power, K.B.E., F.R.C.S., Consulting Surgeon, St. Bartholomew's Hospital. 182 pages. Price \$3.00. Williams & Wilkins, Baltimore, 1931.

The title of this book might lead one to expect something more elaborate and profound than the contents appear to be. Surely "foundations of medical history" should contain at least a passing reference to Hippocrates or Galen! And how can such foundations be laid in six short lectures respectively entitled: "The Story of the Oldest British Hospital"; "Dining with our Ancestors"; "Biography"; "Iconography"; "Bibliography"; and "Aristotle's Masterpiece"? It depends, naturally, on what we consider as foundations. A discussion of systems of medicine, or an account of the growth of various schools, may be valuable and necessary; but these are not indispensable to the task of bringing back to us freshly and warmly the aspects of medical life which we wish to rekindle. Sir D'Arcy Power has dwelt rather on this side of medical history, and, as he says, he has pointed the way along several roads rather than treated a single subject exhaustively.

It is with a deceptive ease that he sketches the history of St. Bartholomew's Hospital, with its 900 years

of work; or tells us of the gradual growth of our customs in eating. The chapter on biography should be read by everyone concerned in the editing of journals, and by the contributors as well. He shows how much remains to be done in medical iconography, and he adds some fresh incidents from his own experience to that ever fascinating subject of bibliography. The last chapter on "Aristotle's Masterpiece" is itself a bibliographical study of great interest.

These lectures develop with no apparent framework, and yet as one reads it soon becomes evident what a wealth of observation and reading has gone to make them up. They may not provide very wide or deep foundations of medical history, but the reader will gain from them some idea of the methods by which medical history should be explored, and incidentally will have had a good deal of pleasure along with it.

Health on the Farm and in the Village. C.E. A. Winslow, D.P.H., Professor of Public Health, Yale School of Medicine. 281 pages, illustrated. Price \$1.00. MacMillan Co., New York; Macmillan Co. of Canada, Toronto, 1931.

This is a very welcome book. It appears at a time, when, by the general consent of all interested workers, the rural health problem is regarded as the most pressing and important one in the public health field. The book is the outcome of a survey by Dr. C.E. A. Winslow of the seven years' experience of the Cattaraugus County Health Unit, established in 1923, by the Milbank Memorial Fund. The survey has been done with that thoroughness, attention to detail and practical vision characteristic of the author.

It is impossible within the scope of a short review to do justice to what is undoubtedly the most outstanding book on rural health to appear in recent years.

The Cattaraugus County Unit consists of bureaux of communicable diseases, statistics, laboratories, public health nurses, maternity, infancy and child hygiene, sanitation, public health education and social service. The organization also provides for a consultation service, nutrition and statistics studies, the care of crippled children. The per capita cost of the Unit amounts to \$2.20. What an advance from the early three- and four-piece unit with a per capita cost of less than fifty cents! This unit has not been functioning long enough to permit of a complete evaluation, yet the good results already accomplished are convincingly shown by statistical demonstration. The service rendered is comparable to that of the best city health organization as noted from the appraisal of the American Public Health Association. It is the opinion of the writer that the Cattaraugus County Unit stands in the very front rank, and its organization, with a few exceptions, is sufficient to adequately meet the health requirements of those who take their living from the soil. Dr. Winslow states the rural health problem, indicates the lessons to be drawn from the survey, and then gives in detail the history, organization, program, accomplishments, and cost of the demonstration. He pays tribute when it is deserved, makes suggestions when to him the occasions presents, and offers criticism if, in his judgment, it is merited.

The urgent call for an adequate mental health service and a social service program in rural districts is stressed, and it is suggested a beginning might be made with the appointment of a psychiatric social worker. The big lessons to be learned from the Cattaraugus County demonstration are, first, the great and pressing need for adequate health service in rural communities, second, the comparatively high cost, and third, the inability of most rural municipalities to provide the necessary funds for such a service. It is a good thing to read a book like this. It brings a message of hope, confidence and encouragement to all. How splendid to know it is practically possible to bring health to the farm and village! No one interested in rural health can afford to be without this excellent book.